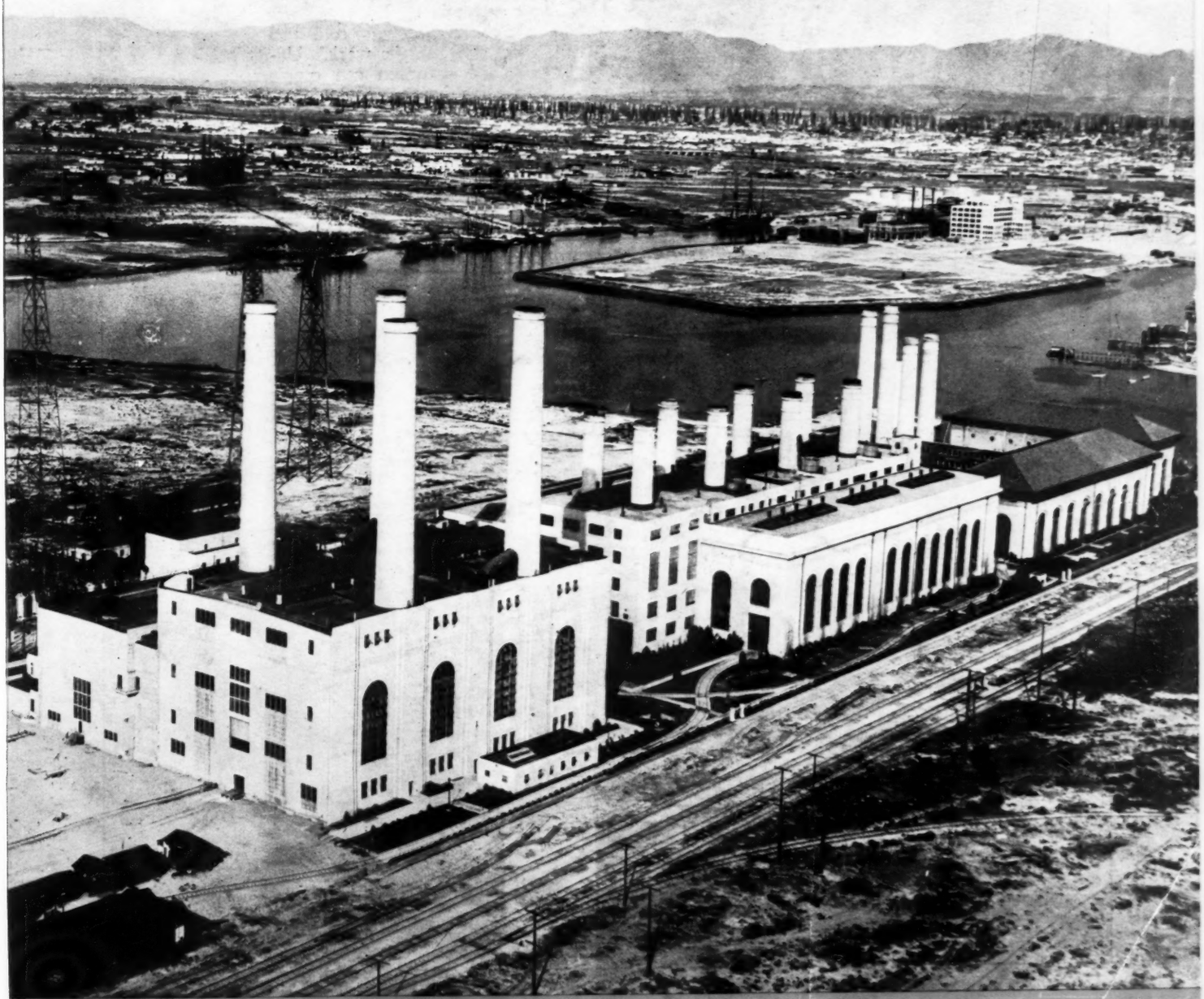
# WESTERN GAS

JAN 16 1934

● THIS POWER STATION HAS WORLD'S GREATEST INSTALLED CAPACITY FOR NATURAL GAS USE
(See Page 30).



January 1934 ♦ ♦ 25 Cents

TP700
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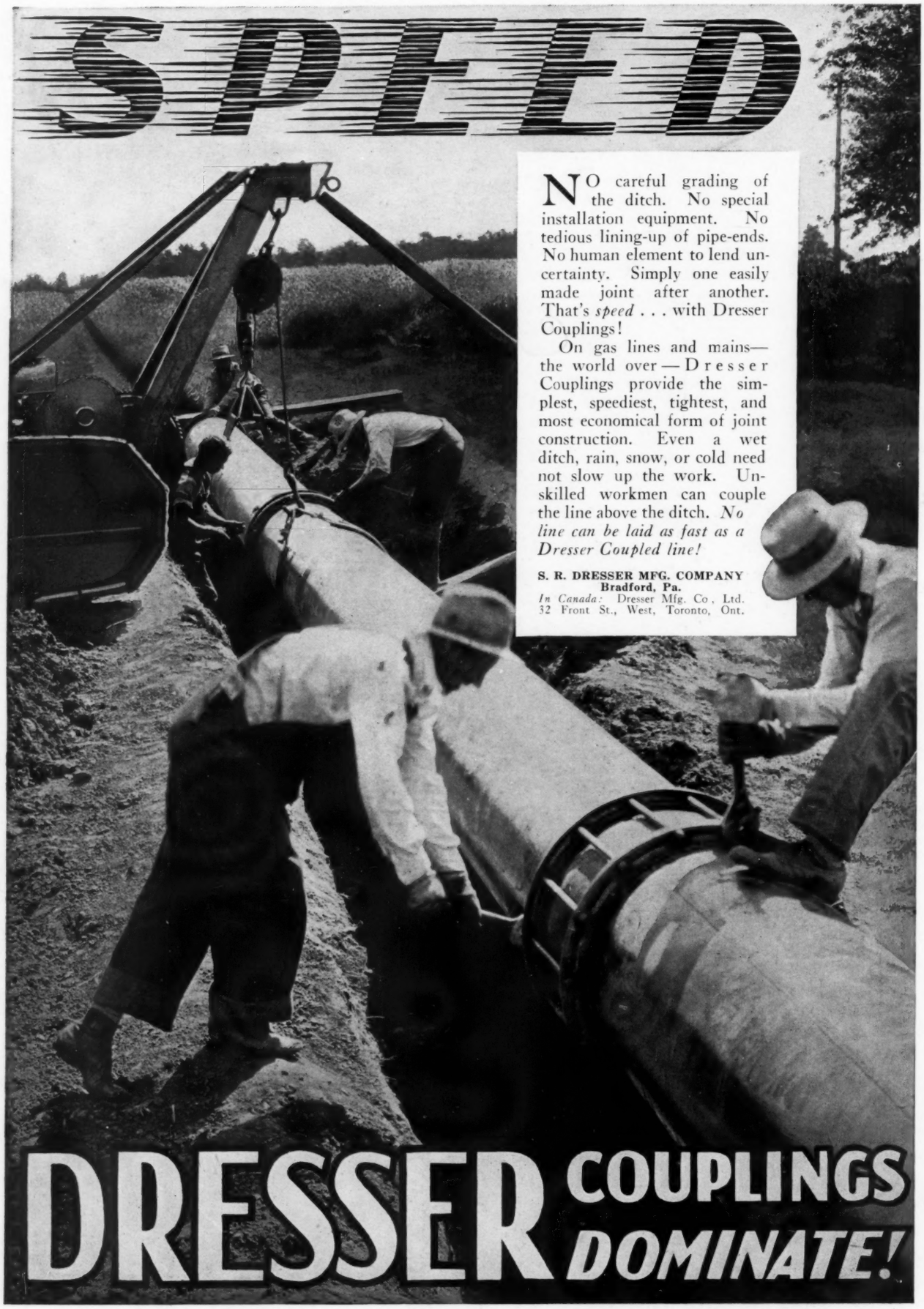
SPEED
NO careful grading of the ditch. No special installation equipment. No tedious lining-up of pipe-ends. No human element to lend uncertainty. Simply one easily made joint after another. That's *speed* . . . with Dresser Couplings!
On gas lines and mains—the world over—Dresser Couplings provide the simplest, speediest, tightest, and most economical form of joint construction. Even a wet ditch, rain, snow, or cold need not slow up the work. Unskilled workmen can couple the line above the ditch. *No line can be laid as fast as a Dresser Coupled line!*
S. R. DRESSER MFG. COMPANY
Bradford, Pa.
*In Canada:* Dresser Mfg. Co., Ltd.
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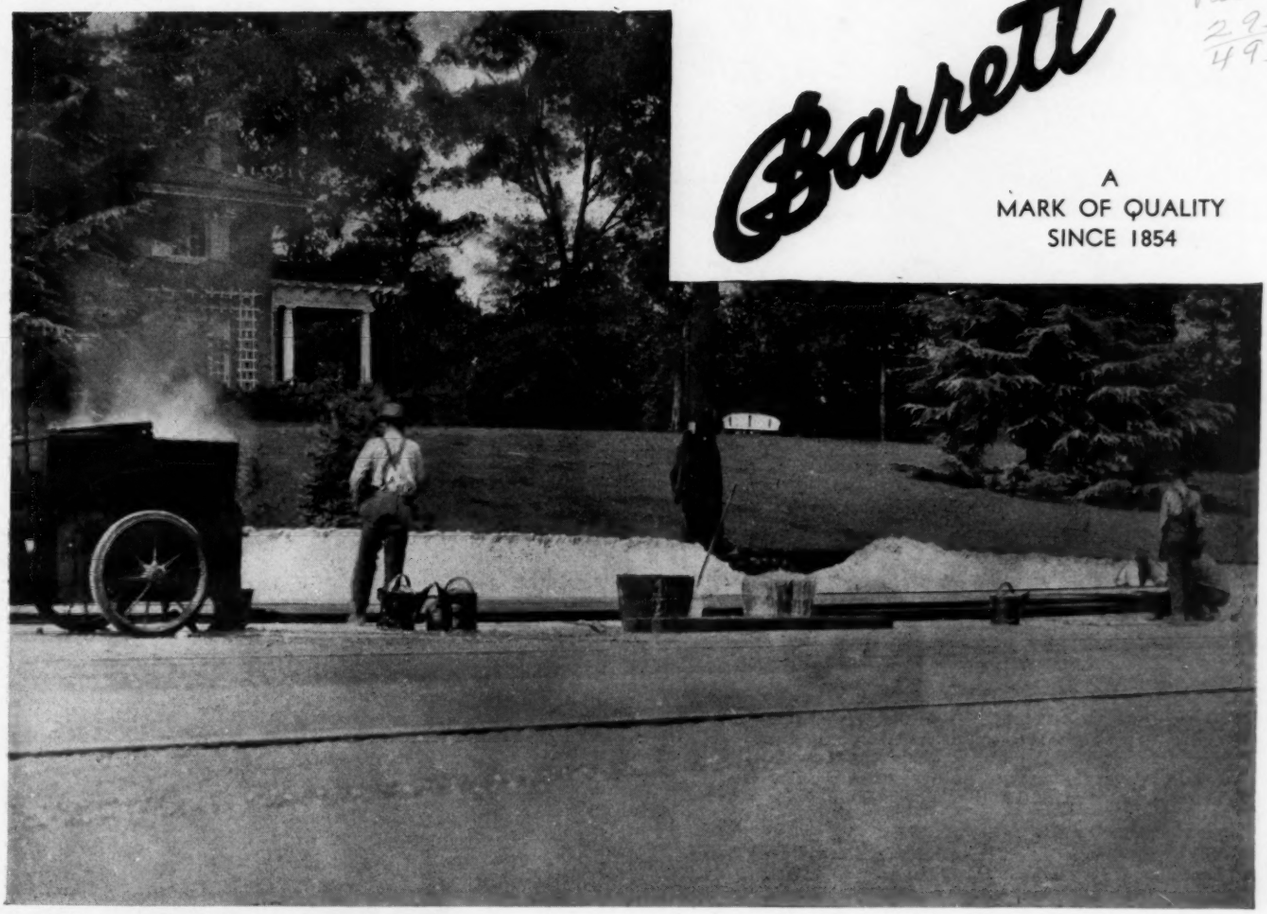
DRESSER COUPLINGS DOMINATE!

Barrett

A MARK OF QUALITY SINCE 1854



# A complete protection service for city pipe lines

Barrett Specification

**Sub pavement congestion of gas, water, telephone and electric pipes and duct systems and underground structures—frequent digging operations for repairs and extensions—rust and electrolysis eating unprotected pipes thin—these conditions warrant the most effective protective coverings for all city pipe lines.**

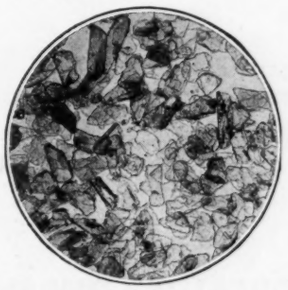
**For economy and efficiency use Barrett Products applied according to Barrett Specifications. Barrett Engineers will gladly cooperate with you in determining the most suitable method of application and the Barrett Products that will give best results—Barrett Pipe Line Enamels, Barrett Service Cement, Barrett Pipe Line Fabric, etc. 'Phone, write or wire.**

The Barrett Company

**40 Rector Street, New York, N.Y.**
**2800 So. Sacramento Ave., Chicago, Ill.**

## PIPE LINE ENAMELS

Service Cement Pipe Line Fabric



**Reproduction of the photomicrograph above shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.**

**For pipe of large diameter, The Barrett Company will furnish equipment required to revolve pipe and spread cement.**

January, 1934, Volume X, Number 1. Western Gas is published by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance) 25 cents the copy; $2.00 per year; 2 years, $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

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## REYNOLDS PRODUCTS

**High Pressure Service House Regulators**
Straight Lever Type; With and Without Mercury Seal; Spring or Dead Weight Type, Models 0, 10 and 20 Series. Toggle Lever Type; With and Without Mercury Seal; Spring or Dead Weight Type, Model 30 Series.

**Low Pressure Service or Appliance Regulators**
Solid Top, dead weight, non-adjustable; Screw Cap Top, dead weight, adjustable; Spring Adjustment, (*Angle or straightway connections. Screw Connections, to and including 3″ size. Flanged Connections, 3″ to 8″ size, inclusive*).

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**Relief Valves**
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**Back-Pressure Valves**
High Pressure; Low Pressure.

**Automatic Quick-Closing Anti-Vacuum Valves**
High Pressure; Low Pressure.

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Single Valve; Double Valve.

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GAS CONTROL SINCE 1892



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## THE SPRAGUE METER COMPANY

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Los Angeles, Calif. San Francisco, Calif.

Davenport, Iowa.

Newark, Ohio. Houston, Texas.

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Reliance Regulator Corporation builds a complete line of high and low pressure regulators for industrial, utility and household appliance gas control. Reliance Regulators are noted for their uniformity of pressure control in handling manufactured, natural or butane air gases.

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REGULATORS YOU CAN RELY ON — RELIANCE — SINCE 1911

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## THESE FEATURES OF ELECTRIC WELD PIPE

*against any other pipe*

- 100% WELD ✓
- LONG LENGTHS ✓
- PERFECTLY ROUND ✓
- CLEAN INSIDE AND OUT ✓
- UNIFORM WALL THICKNESS ✓
- STRAIGHTNESS ✓
- FINE FOR EVERY TYPE OF JOINT ✓
- ANY DEGREE OF STRENGTH OR DUCTILITY ✓

Do this and you can't go wrong, whether it's casing or tubing you need for a well, pipe for a long line, or a pipe for the building of a new refinery or the maintenance of an old one.

Certainly most pipe has a dependable weld, but Republic Electric Weld is 100 per cent. Some pipe can be had in long lengths—Electric Weld is made up to 50 feet. And as you check the features of this better pipe you will find that while other makes possess some of them, only Republic Electric Weld can honestly claim to have them all.

And it's all in the way it's made. Clean strip is formed cold to a perfect round. The seam is welded by electrical resistance where the edges meet. No metal is added at the weld and the grain structure is virtually the same at the weld as at any other point in the pipe wall. No furnaces to cause scaling. No heating of the entire mass of metal to make it out of round. No long cooling to jeopardize its straightness.

Before you buy pipe check into the advantages that Republic Electric Weld Pipe will bring to your particular work—find out how it will save you time and money. Write for a copy of "Electric Weld Pipe." A reading is convincing.

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**ELECTRIC WELD**
**LINE PIPE • CASING • TUBING**

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# WESTERN GAS

"Reg. U. S. Pat. Off."

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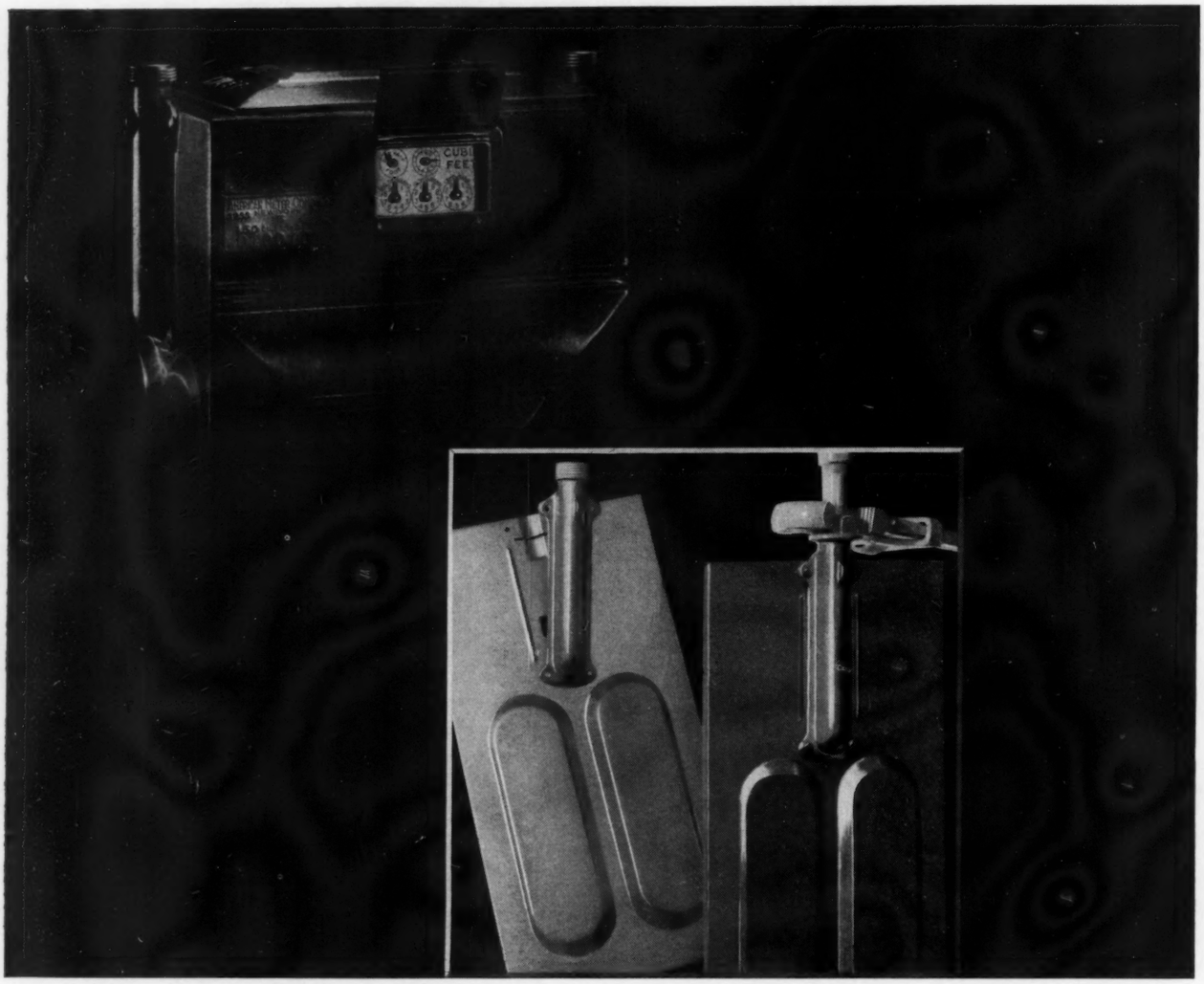

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**The more thorough your meter records on cost and performance, the greater your proof of the accuracy and economy of American Meters.**

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*Measurement and control of Gas, Oil, Steam, Air and Liquids*
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January, 1934

# WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. X, No. 1

**A Monthly Journal of the Gas and Gas Appliance Industries in *Western America***

# Review of the Month

## Meters, Industrial Sales Ahead of 1932

THE year 1933 ended on an optimistic note for the gas industry, from the standpoint of business revival. Most companies are reporting a very satisfactory increase in meters, marking the return of former customers deprived of gas service during depression days. Industrial sales are definitely ahead of 1932.

In spite of the confusion attendant upon industrial reorganization and the uncertainty as to what direction federal activities will next take, confidence in the future is mounting.

Gas revenues for the year, as might be expected, fall somewhat under 1932 levels. The revenue decline for natural gas utilities however was only 3 per cent, according to preliminary figures of the American Gas Association. Manufactured gas revenues are estimated at 7.5 per cent under 1932.

Natural gas sales were 2 per cent over 1932, and manufactured gas sales were 5 per cent below the preceding year. The natural gas sales gain included a 7 per cent increase in industrial sales, offset to some extent by a 4.2 per cent loss in domestic and commercial sales.

For natural gas companies the number of customers served is expected to remain about constant as compared with 1932, while manufactured utilities may show around a 2 per cent loss in customers.

Behind the general figures given above for the industry is a heartening picture of business increases for individual companies during the latter part of 1933. Late in December *Western Gas* asked two questions of a few companies representative of the larger operators in its circulation area. The questions:

What gain in total active gas meters do you show as of December 1, 1933, over December 1, 1932?

What gain in industrial gas sales do you show for the first 11 months of 1933 compared with the same period of 1932?

Answering for the reporting companies we find the following:

*Oklahoma Natural Gas Co.,* Tulsa, Okla.—shows no change in number of active meters, but an exceptionally strong gain in industrial sales—a 45 per cent increase over 1932, with a gain in cubic foot sales of 1,593,252,000.

*Kansas Power and Light Co.,* Salina—reports an increase of 7.3 per cent in active gas meters (1,613 meters) and a 19.7 per cent increase (180,497,000 cubic feet) in industrial gas sales.

*Iowa-Nebraska Light and Power Co.,* Lincoln, Nebraska—has gained 1.9 per cent in total active gas meters (566); industrial gas sales were 71 per cent above the previous year (263,614,000 cubic feet), which good showing was occasioned by addition of several large customers late in the year. Including domestic and industrial branches sales for this company increased 29 per cent.

*New Orleans Public Service Inc.*—total active gas meters fell fractionally under the year previous, a loss of only 122 meters or .16 of 1 per cent; on the industrial side the company showed a gain of 12.1 per cent for the year (163,571,604 cubic feet).

The record of meter increase and industrial sales gains shows a decided upturn for leading California companies.

*Pacific Gas and Electric Co.,* San Francisco—total active meters increased .93 per cent, a gain of 4,740; the industrial sales total for the first 11 months of 1933 was 398,825,500 cubic feet above the same period for 1932, or 23.21 per cent.

*Los Angeles Gas & Electric Corp.*—gained 5,508 active meters, which represented 1.58 per cent of total meters; industrial sales fell off 5.79 per cent.

*Southern Counties Gas Co.,* Los Angeles—reports 2,342 active meters ahead of last year, 1.7 per cent increase; and 2.7 per cent gain in industrial gas sales (91,340,000 cubic feet). These figures are exclusive of industrial sales to the San Diego Consolidated Gas and Electric Co., which amounted to 2,506,426,000 cubic feet.

*Southern California Gas Co.,* Los Angeles—gained 5,325 in total active meters, or 2.34 per cent over December 1, 1932; industrial sales for Southern California Gas Co. were 5.03 per cent in advance of the 1932 period, a gain of 790,114,000 cubic feet.

In addition to the brisk pick up in industrial sales during the last half of the year, a number of other factors gave impetus to gas sales revival. On the domestic side the country-wide refrigeration campaign was particularly significant. Results of this effort are reported elsewhere in this issue.

The industry enters 1934 with a determined spirit to concentrate on load-building. For several months commercial departments have been ahead of 1932 levels and there is good reason to feel that the momentum will be accelerated. As reemployment progresses customers are coming back on the line; their first purchasing will naturally come under the head of household necessities, among which are numbered gas appliances. Practically all companies have laid plans for vigorous new business promotion to make the most of present opportunities.

## Coal Interests Seek Tax on Natural Gas

SOME sort of proposal for taxing natural gas, either as produced at the well or as sold to industries, will get

a hearing in the present session of Congress, if plans of the National Coal Association carry through. Coal interests are solidly behind the project; support of the United Mine Workers of America is claimed as well as that of the railroads. In recent bulletins the Coal Association indicates that 10 cents per thousand cubic feet may be urged for the proposed tax.

Conferences of coal attorneys were held in December on the tax matter, and a committee representative of regional coal associations charged to draft a bill.

The natural gas industry must lose no time in meeting this threat. Injustice of the proposal is manifest, but there are plenty of instances on record where one industry has improved its position at the expense of another through legislation.

If the coal operators should be successful in perpetrating such a tax as that proposed, they would at one stroke eliminate natural gas as an industrial fuel in competitive areas; more than this, they would insure coal of invading well-established natural gas consuming centers. Industrial consumers, as much as the utilities, would be the losers and they should be among the first to be heard in protest.

There should be no disposition to take this threatened tax lightly. The 3 per cent federal levy on gross sales of electricity, adopted by the last Congress, is good and sufficient indication of what can be done.

Bringing coal opposition down to local cases, the Illinois Commerce Commission received a formal complaint in December from the Illinois Coal Operators' Association, charging sale of natural gas below cost in the Chicago area. Hearings due on January 10 will precipitate a coal-versus-natural gas battle in this important industrial center.

## Missouri Gets Facts on Municipal Utilities

UTILITIES in the State of Missouri believe in speaking out to their public on issues which affect them. Any issue vital to public utilities is fairly apt to be one in which the public has a mutual interest, in the Missouri experience. So it was with the anti-utility merchandising phobia. Faced with the same sort of agitation which put this law across in the neighboring State of Kansas, the Missouri Association of Public Utilities went into an aggressive advertising and publicity campaign through every newspaper in the State, and told the users of utility services just how they would suffer if the gas and electric companies were barred from selling appliances. No legislation of this sort is on the Missouri books.

Now the whole matter of municipal ownership and tax-exempt municipal utilities is getting an airing in 540 Missouri newspapers through paid advertising of the utilities. Well written copy tells tax payers that there is $100,000,000 in tax-exempt municipal utility property in the State; that the farmer's tax load is heavier due to exemption of municipal utility property from tax rolls.

Publicity accompanying the campaign points to the decrease in municipal projects throughout the country, to the higher rates charged by municipal utilities in Missouri, to rejection of municipal bond issues in current elections.

It is plainly stated on each advertisement that the message is issued by the gas, electric, and water companies of Missouri. To build up a tangible showing of public sentiment each display piece of copy carries this coupon:

**IF YOU WANT A SQUARE TAX DEAL, MAIL THIS NOW**

ASSOCIATION FOR TAX EQUALITY
Box 38, Jefferson City, Mo.

I am in favor of an amendment and a law which will place all businesses on the tax rolls—whether privately or publicly owned—so that all such property shall pay its proportionate share of state, county and school taxes as well as state and federal income taxes.

I pledge that I will vote against any candidate for public office who is known to be opposed to such an equitable tax law.

NAME.....

ADDRESS.....

Missouri utilities are on the right track. They get their facts in hand and then use them freely. Perhaps the exact methods followed in Missouri will not apply in all localities, but the principle is sound; and Missouri utilities are satisfied that they are getting their story across.

## City-Owned Plants Taxable in Indiana

INDIANA is another section where utilities have brought the municipal plant situation into the open. Agitation for municipal ownership in Indiana back in 1932 was met by vigorous advertising campaigns in farm papers and other media. These messages pointed out that when private plants are supplanted by public a large block of property goes off the tax duplicates, to the detriment of all other tax-paying properties.

When the Indiana utility laws were redrafted in the 1933 legislature, making municipal ownership more easily obtainable by cities desiring it, the farm element in the legislature saw to it that the cities' utility properties would be subject to county and state taxes. The pertinent section from Indiana Statutes, 1933, reads as follows:

The property of any municipally owned utility shall be subject only to such taxes as are assessed against other property for state and county purposes and such property shall be assessed for taxation in the same manner as the property of public utilities is assessed and such taxes shall be paid out of the income of such municipally owned utility:* Provided, however, That no municipally owned utility shall be subject to such state, and county taxes payable in 1934; and provided further that any municipally owned and operated utility used exclusively for the furnishing of utility service to such municipality itself, for its own municipal purposes, or any part of the valuation of any municipally owned and operated utility which may be determined by the public service commission to be reasonably allocated to the furnishing of service to such municipality itself for its own municipal purposes, shall not be subject hereunder to the payment of any taxes whatsoever.

## Regulation at Its Worst In Seattle Case

VALUATION and rate proceedings in recent time have been conducted with little regard to precedent, logic, or common equity. It is almost a foregone conclusion that company valuations will be rejected, former accepted rate bases will be slashed, and investigation will follow upon investigation with no thought to the costs involved. The regulatory mill must grind out its grist until utilities join the ranks of businesses operating below cost, until stockholders' returns vanish, until customers bear the ultimate cost in depreciated service.

One case among many is that of the Seattle Gas Co. proceeding, in which regulation has run riot. A few of the details are worth reciting.

This case grew out of an ordinance adopted by the City of Seattle in May, 1932 whereby a special occupation tax of 3 per cent was levied on all gas, electric, water and other public service companies. Having insufficient revenues to permit of absorbing the tax the gas company applied to the Department of Public Works for permission to add it to customer's bills. After due hearings the Department of Public Works in an order dated January, 1933 gave the desired permission. This was

*(Continued on Page 38)*

# Appliance Code In Force

## *Comments on Its Administration . . . Text of Code*

*By* GEORGE H. FINLEY
*Editor, Western Gas*

"THE Code is law. It will be enforced.

"It will be enforced because it is law, and American business men are legal; because it is enthusiastically favored by a high percentage of the industry's own members; because the industry's self-discipline now has Government authority behind it; because the code is soundly and fairly drawn, to meet the industry's critical needs."

In some such wise as the above might be summarized the message which George E. Frazer, consultant for Gas Appliances Institute, brought to manufacturers of the industry in December.

The Code of Fair Competition for the Gas Appliances and Apparatus Industry took effect on December 7, and Mr. Frazer spoke before two meetings of manufacturers shortly following—at San Francisco on December 12, at Los Angeles on December 14—giving a clear answer to the questions existing in everyone's mind as to how the Code will be administered. He also told at length of difficulties surmounted in preparing and getting adoption for the code as an instrument covering a unified gas appliance and gas apparatus manufacturing industry.

Both Pacific Coast meetings were presided over by ElRoy Payne, president of the Payne Furnace & Supply Co., and Pacific Coast member of the Gas Appliances Committee, which is the Code Authority.* Mr. Payne is also chairman of the Pacific Coast Gas Association Manufacturers' Section for the current year.

### REGULATION IS HERE

The gist of Mr. Frazer's remarks was that present discussion of the Code's merits is beside the point—regulation under the Code is here, whether or not some elements in the industry approve it.

Indicating the preponderant support which is behind the Code the speaker stated that present membership in the Institute represents more than 80 per cent of the capital and more than 80 per cent of the sales in the industry. He made it plain that provisions in the Code apply with equal force to members of the Institute and to non-members, and that assessments covering administration costs will be levied upon every unit in the industry.

The message distinguished between Federal and industry aspects of code enforcement. The federal administration's primary interest in codes is protection of labor and the customer, while maintenance of manufacturers' prices above costs is industry's main concern. The government may be relied upon to take prompt action where labor provisions of the Gas Appliances and Apparatus Code are infringed. And the industry through its code representatives will go into action wherever any form of price disturbance raises its head.

There is no intention on the part of the Gas Appliances Committee to regulate operating policies within the industry, except as these bear directly upon maintenance of price above cost. No effort will be made, for example, to engage in credit information. No attempt will be made to control retail prices. No regulations will be set up as concerns testing apparatus for quality. The Committee views its job as being solely to bring the prices of every manufacturer above his individual costs.

Administration of the Code will be handled flexibly, with all legitimate consideration for the "regular" element of the industry and rigid bearing down upon "irregulars." At an early date the Committee will originate complaints on its own motion against firms which appear in the lowest bracket of price structure, according to Mr. Frazer.

Under the head of enforcement the speaker indicated two general methods available to the Committee. One possible step is to hail offenders into court. While fully within the scope of the Code this method will be used with reluctance, for it invites the further incursion of the government into industry regulation.

Another means of enforcement which will be utilized by the Committee is an appeal to the fairmindedness of those buying the industry's products. Names of those who comply with the Code will be made known to the trade. No "blacklisting" is contemplated, but the Committee holds to the view that purchasers will support the "regular" and refuse support to the "irregular" members of the industry.

### PRICES FILED WITH COMMITTEE

All firms were instructed during December to file their prices with the Committee. Names of non-filers will be reported to the N. R. A. if necessary. Prices not on file with the Committee will automatically become illegal, and the Committee will join forces with any customer refusing payment in cases where prices are not on file.

Prices filed with the Committee are to be accompanied by certificates stating that they are above costs. Mr. Frazer made it plain that the Committee will carefully scrutinize the prices of firms which consistently appear in the lower price brackets and will require substantiating evidence that their prices are above costs. Accounting methods of price disturbers will be directly investigated.

At the outset the Committee does not intend to invoke a standard cost accounting system for the industry, preferring rather to concentrate its efforts upon known price disturbers and to leave legitimate operators a maximum of freedom to conduct thier business along individual lines. Any form of accounting which takes care of normal competitive costs will be satisfactory for the Committee's purposes at the present. Standardized accounting, however, will be introduced if the need arises.

Machinery for enforcing the Code consists of:

The Gas Appliances Committee.

Governing Committees for each of the major product groups within the industry.

An Administration Committee with representation for the various products and sections in the industry.

Administration Committee members will have original jurisdiction on complaints, in the sections where the complaints originate. These committeemen will be assisted by special accountants if necessary and will file their reports with

*Membership of the Gas Appliances Committee is reported in *Western Gas* for December 1933, Page 21.

the Governing Committee of their product group. Appeal from the recommendations of the Administration Committee may be taken to the proper Governing Committee, and thence to the Gas Appliances Committee.

If further recourse is desired the complaint may be appealed from the Gas Appliances Committee to the N. R. A. and from the N. R. A. through the federal court system. However, the original recommendation of the Administration Committee will be regarded as basic.

Complaints under the Code will be of two types, first, those brought by the industry itself against the individual; second, public complaints. Industry complaints will be prosecuted by the industry's own consultants and costs prorated. Complaints which are not accepted for prosecution by the industry may be filed directly with the Administration Committee, in which case the name of the complainant will be made public. In cases where such complaints are found unjustified the complainant will be required to bear the costs incurred.

It was pointed out that the present Code, like any form of law, is subject to change and that the Gas Appliances Committee will represent the industry to the N. R. A. where changes appear needed.

### INDUSTRY MUST DO THE ENFORCING

Commenting upon the urgent need for complete cooperation under the Code Mr. Frazer called attention to possibilities which might follow upon the industry's failure to handle enforcement adequately. He pointed to the school of thought at Washington which regards the present industrial codes as the entering wedges in a government-run planned economy. By this school of thought the failure of self-regulation would be quickly accepted as an invitation to place the government in active administration of the industry.

The tendency which has been shown by the government to utilize codes for carrying out purely social legislation in a number of industries—such as those of the distillers and brewers, the wholesale grocers, and the investment bankers—was also held up as another sign calling for successful administration of the present Code by the industry itself.

Location of an office on the Pacific Coast for the filing of prices by Pacific Coast manufacturers is contemplated by the Committee, providing that prompt cooperation from Coast manufacturers is forthcoming. The firm of Frazer & Torbet, consultants for the Gas Appliances Committee, may also appoint accountant representatives on the Pacific Coast to conduct cost investigations.

Gas Appliances Institute maintains its headquarters at 3900 Board of Trade Building, Chicago, Ill.

The Code now in force will affect every manufacturer serving the gas industry, and will also concern purchasing practices of all gas companies. Because of its importance it is published in full below.

## CODE OF FAIR COMPETITION FOR THE GAS APPLIANCES AND APPARATUS INDUSTRY

### ARTICLE I—PURPOSES

To effectuate the policy of Title I of the National Industrial Recovery Act, the following provisions are submitted as a Code of Fair Competition for the Gas Appliances and Apparatus Industry, and, upon approval by the President, shall be the standard of fair competition for this Industry.

### ARTICLE II—DEFINITIONS

The term "gas appliances", as used herein, means gas ranges, gas water heaters, gas space heaters, domestic gas boilers, domestic gas furnaces, domestic gas conversion burners, gas refrigerators, gas meters, gas thermostat controls, gas mantles, and, generally, gas appliances and gas apparatus of all styles, types, and kinds for use in the production, distribution, and utilization of natural gas, liquefied petroleum gases, and of manufactured gas, including uses in cooking, heating, refrigeration, and lighting, excluding, however, any products covered by other codes approved by the President.

The term "gas appliance industry" as used herein includes the manufacturing and assembling within the United States of gas appliances and gas apparatus, and the manufacturing and assembling of parts therefor, including repair parts and repairs, and the selling of such appliances to retailers, wholesalers, and consumers, but does not include the selling at retail.

The term "Administrator" as used herein means the Administrator appointed by the President to administer Title I of the National Industrial Recovery Act at the time of office.

The term "Institute" as used herein means Gas Appliances Institute, a trade association, having its office at 3900 Board of Trade Building, Chicago, Illinois.

The term "Committee" as used herein means the Committee established in Article VI of this Code.

The term "employee" as used herein includes anyone engaged in the trade industry in any capacity receiving compensation for his services, irrespective of the nature or method of payment of such compensation.

The term "employer" as used herein includes anyone by whom such employee is compensated or employed.

The term "effective date" as used herein means the 10th day after this Code shall have been approved by the President of the United States.

The term "expiration date" as used herein means the expiration date indicated in the Act, or the earliest date prior thereto on which the President shall by proclamation or the Congress shall by joint resolution declare that the emergency recognized by Title I of the National Industrial Recovery Act has ended.

The Southern Wage District is defined as comprising North Carolina, South Carolina, Florida, Georgia, Alabama, Tennessee, Mississippi, Virginia, and Louisiana; and the Northern Wage District is defined as comprising all other States in the United States, proper, including the District of Columbia and Alaska.

### ARTICLE III—MANDATORY PROVISIONS AS TO LABOR

Employers in this Industry shall comply with the requirements of the National Industrial Recovery Act, as follows:

(1) Employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection;

(2) No employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and

(3) Employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

### ARTICLE IV—CONDITIONS OF EMPLOYMENT

#### Wages

On and after the effective date the minimum wage which shall be paid by any employer to common labor shall be 40c per hour for males and 35c per hour for females in the Northern Wage District; provided, however, that for a period of 60 days from the effective date of this Code the minimum rates for female employees shall be 33½c per hour in the Northern Wage District.

On and after the effective date the minimum wage which shall be paid by any employer to common labor shall be 35c per hour for males and 30c per hour for females in the Southern Wage District, unless the hourly rate for the same class of work on July 15, 1929, was less than the respective one of these minima, in which latter case the minimum shall not be less than the hourly rate on July 15, 1929, and in no event less than 32c for males and 27c for females.

Provided, further, that employees apprenticed under, and in accordance with, the laws of any State, and learners may be paid not less than 80% of the minimum wages established in paragraph one of this Article for the Northern Wage District, and paragraph two of this Article for the Southern Wage District, and the total number of such apprentices and learners shall not exceed 5% of the total number employed by any such employer in any calendar month; and

Provided, further, all learners shall receive not less than the minimum rate of pay after three months' employment.

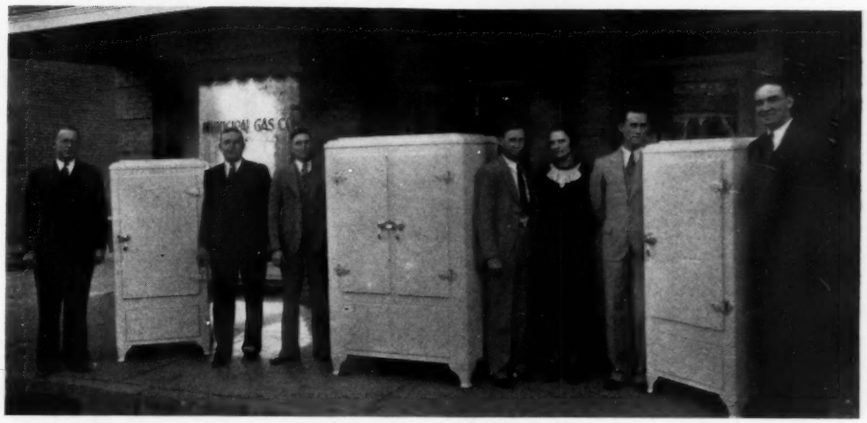
Provided, further, that where any State Law requires any higher minimum wages than those specified in this section, such higher minimum wages shall apply in all cases.

Equitable adjustments in all pay schedules of factory employees (and other employees receiving less than $35.00 per week) above the minima, shall be made on or before fifteen days subsequent to the effective date of this Code by any employers who have not heretofore made such adjustments or who have not maintained rates comparable with such equitable adjustments; and the first reports of wages, required to be filed under this Code, shall contain all wage increases made since May 1, 1933.

In the case of an employee whose compensation is based upon a measure other than time, the minimum compensation paid shall

*(Continued on Page 21)*

# Results *of the* Ice Cube Contest



FIRST PRIZE WINNERS, from the Ennis, Texas, office of Municipal Gas Co. Left to right, they are: James H. Duke, manager, Carl Owens, Ray Maggard, Percy Williams, Mrs. W. C. Croxdale, cashier, J. D. Robertson and E. R. Hughes, Jr.

SECOND PRIZE WINNERS, also of Municipal Gas Co., at the Hillsboro, Texas, office. Reading from left to right: C. E. Washman, S. S. Petty, Elder L. Buelow, manager, Miss Margie Blount, cashier, Earl Akin and Andrew McCabe. (Judson Henderson, employee, not present when photo made).

TABULATION of results in the "ice cube" prize contest conducted from July 1 to October 30, 1933 by the American Gas Association Refrigeration Committee was completed during December and the following winners of primary prizes are announced:

*First Prize:* Won by the Municipal Gas Co., Ennis, Texas—J. H. Duke, local manager. Meters registered, 900. Ice cubes sold, 3348. Average of 372 ice cubes per 100 meters.

*Second Prize:* Won by the Municipal Gas Co., Hillsboro, Texas—E. L. Buelow, local manager. Meters registered, 1050. Ice cubes sold, 2448. Average of 233.1 ice cubes per 100 meters.

*Third Prize:* Won by the Sumpter Gas & Power Co., Sumpter, S. C.—J. S. Rider, local manager. Meters Registered, 825. Ice cubes sold, 1322. Average of 160.2 ice cubes per 100 meters.

*Fourth Prize:* Won by the Boston Consolidated Gas Co., Concord, Mass.—J. A. Young, local manager. Meters registered, 1156. Ice cubes sold, 1560. Average of 134.9 ice cubes per 100 meters.

This nation-wide sales contest was the first of the kind ever run as an A. G. A. activity. It commanded the participation of more than 300 local gas company sales offices, representing 3½ million retail meters. Sales offices at every point in the country during campaign dates put vigorous efforts into closing sales of the various Electrolux domestic gas refrigerator units.

*The First Twenty*

Here are the first 20 companies in the order of their contest standings:

1. Municipal Gas Co., Ennis, Texas office.
2. Municipal Gas Co., Hillsboro, Texas office.
3. Sumpter Gas & Power Co., Sumpter, S. C.
4. Boston Consolidated Gas Co., Concord, Mass. office.
5. Municipal Gas Co., Bowie, Texas office.
6. Alabama Natural Gas Co., Talladega, Ala. office.
7. Mississippi Service Corp., Columbus, Miss.
8. Southern Gas Utilities, Seguin, Texas.
9. Ramapo Gas Corp., Spring Valley, N. Y. office.
10. Southern California Gas Co., Taft, Calif. office.
11. Portsmouth Gas Co., Portsmouth, Va.
12. Illinois Gas Co., Lawrenceville, Ill.
13. Palestine Light, Heat & Power Co., Palestine, Texas.
14. Portsmouth Gas Co., Portsmouth, N. H.
15. Public Service Corp. of Mississippi, Hattiesburg, Miss.
16. Natural Gas Co., Inc., Monroe, La.
17. Georgia Public Utilities, Rome, Ga.
18. Malden & Melrose Gas Co., Reading, Mass. office.
19. Westchester Lighting Co., Mt. Kisco, N. Y. office.
20. Brooklyn Union Gas Co., Flatbush Branch, N. Y.

Contest results were set up on an "ice cube" basis, competing offices being credited with the number of ice cubes sold per each 100 registered retail meters. This automatically threw the different sized refrigerators into their relative places, giving more weight to the larger models.

Prizes offered through manufacturers of Electrolux totaled $1700, divided as follows:

First Prize: $750, local manager receiving $200 and remaining $550 being distributed among salesmen.

Second Prize: $500, local manager receiving $150 and salesmen $350.

Third Prize: $250, local manager receiving $50 and salesmen $200.

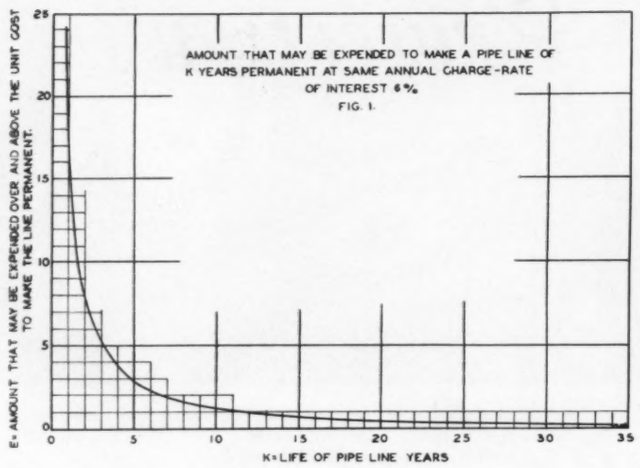
Fourth Prize: $200.

At the outset of the contest only three prizes were at stake, but when it developed that first and second prizes were won by two district offices of the same company, the manufacturers offered a fourth prize.

This notable refrigerator campaign helped to improve the whole tone of gas company sales promotion during the latter part of 1933.

Much of the credit for its success goes to Cyrus Barnes and R. A. Malony, respective chairmen of the A. G. A.

*(Continued on Page 44)*


AMOUNT THAT MAY BE EXPENDED TO MAKE A PIPE LINE OF K YEARS PERMANENT AT SAME ANNUAL CHARGE-RATE OF INTEREST 6%
FIG. 1.
E= AMOUNT THAT MAY BE EXPENDED OVER AND ABOVE THE UNIT COST TO MAKE THE LINE PERMANENT.
K=LIFE OF PIPE LINE YEARS
0
5
10
15
20
25
30
35

# Economics of

*By* W. R. SCHNEIDER

THIS paper covers some of the major points to be considered when determining the condition of a pipe line, its probable life, and the type of additional protection that should be applied if the line is found to be depreciating at an excessive rate.

In order to locate the positive areas, to determine their extent, and the magnitude of the current discharged by the pipes, an electrolysis survey should be made. The surveys made by the Bureau of Tests and Inspection of the Pacific Gas and Electric Co. are made with an earth current meter showing the current flowing to or from a bared spot on the pipe. These readings are checked by the simultaneous measurement of the pipe current and readings of the potentials to other pipes, rails, etc.

The earth currents are subject to seasonal fluctuations, and occasionally a positive area is found that lasts only for a short length of time during each year. The average corrosion on the pipe during a year consequently differs from what would be expected from the results of a short time test.

In order to determine the average value of the corrosive action taking place during the year, corrosion plates or coupons are installed in positive areas where a discharge of one milliampere or more per square foot of pipe surface has been found by test. These coupons, and their characteristics have been described in previous papers.†

The pitting and loss of weight of these plates shows the possibilities and magnitude of the corrosion that will take place at each exposed portion of the main. These exposed portions will be found in pinholes, abrasions and sometimes in a chemically injured wrapper.

If the insulation is in exceptionally good condition and of high resistance in the vicinity of the corrosion coupons, the appearance of these coupons will be no indication of the condition of the pipe in that vicinity.

If, however, tests show a loss of current in the portion of pipe to which the coupons have been connected, and the condition of the coupons is such as to warrant further investigation, several lengths of pipe should be uncovered at one or more locations in the suspected area and insulation tests made on the wrapping. For this purpose the pattern test,†† conductance test, or spark test may be used. This should be followed by stripping the pipe and examining the metal surface for pits wherever the tests indicate the coating to be defective.

The importance of examining a number of lengths of pipe for pitting should not be overlooked. In a corrosive area it is frequently found that a number of lengths of pipe will show little or no pitting and the adjacent lengths will be badly pitted and the pipe even perforated. This is probably due to variations in corrosivity of the soil along the pipe, and the unpitted portions receiving some cathodic protection from the pitted portions. At least 50 square feet of pipe surface should be examined at a time and several lengths opened a few hundred feet apart in all large or very corrosive areas.

The average depth of the three maximum pits may be taken as a measure of the life of the pipe. This "life" is the factor on which the calculations of the maximum permissible expenditure for pipe reconditioning are based.

In Fig. 1 is shown the amount in dollars, E, that may be spent per dollar of original cost, to make a line, having a life of K years, permanent, without increasing the annual cost. An example will make this clear:

A 16-inch line costing $20,000 is found to have a life of only six years, after which it must be completely renewed. If the line is not given additional protection and must be completely renewed every six years at the original cost of $20,000, the annual charge will be:

| | |
|---|---|
| To depreciation fund at 6% | $2870 |
| Interest on $20,000 at 6% | 1200 |
| Total | $4070 |

From the curve in Fig. 1, the maximum amount, E, that can be expended to make the pipe permanent equals: $2.39 per dollar of original cost.

| | | |
|---|---|---|
| Therefore, for the above 16-inch line, | E = 2.39 x $20,000 | $47,800 |
| | Original Cost | 20,000 |
| and the | Total Cost | 67,800 |
| | Annual cost at 6% | 4,070 |

In other words, the annual cost of the line has not been increased, if the amount spent to increase its life to a point where it may be considered permanent, does not exceed the values given by the curve in Fig. 1.

Obviously, if the line can be reconditioned to give it an indefinite life for an amount less than $47,800, both the investment and the annual charges will be reduced.

It is seldom necessary to protect a line even in a very corrosive region so as to give it an infinite life against external corrosion when it has a limited life due to internal corrosion. Due to increasing population, and increased loads, the pipe line may have to be replaced by a larger one within a comparatively shorter time than frequently would be estimated. Often, industrial districts shift to new locations or highways are relocated so that the main must be abandoned after only a few years of service. Protecting a line to give it a permanent life would be a waste of capital and an unnecessary increase in the annual cost, in cases of this kind.

In view of these possibilities ,a shorter ultimate life of the main is chosen, as the maximum permissible expenditures for pipe protection as given in Fig. 1 are not always demanded.

The number of dollars that may be expended on a pipe, having a certain life to increase it a given number of years with money at 6 per cent is given in

† Cathodic Pipe Protection by P. G. and E. Co. W. R. Schneider, *Western Gas* April, 1933, pg. 20; and Cathodic Protection of Pipe Lines, W. R. Schneider, *Gas Age Record*, April 8, 1933, pg. 355.

†† A.P.I. Pipe Coating Tests, Gordon N. Scot, American Petroleum Institute, December 1931—Production Bulletin No. 208, page 94.

# Cathodic Pipe Protection

*Bureau of Tests and Inspection*
*Pacific Gas and Electric Company**

Fig. 2. These curves show the maximum amount that may be expended on a pipe to increase its life without increasing the annual charges.

The amount that may be expended for coating pipe lines has been discussed by many writers, and the values given by the above curves agree well with the average of these opinions.

When a line must be given additional protection, the final deciding factor is the costs of the various available methods.

To recondition a line is an expensive operation due to the fact that a digger must cut a trench on each side of the pipe and the portion under the pipe must be removed by hand labor. The pipe must then be scraped and cleaned, pits in the surface filled, the surface primed and the pipe finally rewrapped by hand. The latter operation is necessarily more expensive than the machine wrapping originally put on above the ground before the pipe was laid. In the case of a pipe below 6 inches in diameter the cost of reconditioning is likely to approach the cost of a new line. The only difference lies in the cost of the pipe, hauling to the location, and welding.

An approximate cost of installing pipes of various diameters, exclusive of transportation is given in Fig. 3. Unit costs depend on the amount of pipe laid, the type of country and distance to which the material must be transported. The cost in any particular case must be determined by giving due consideration to these factors.

To compare the costs of reconditioning a line and applying cathodic protection, we will use the 16-inch line previously mentioned costing $20,000 per mile and having a life of six years.

Reconditioning costs would be as follows:

| | |
|---|---|
| Cost of original insulated line per mile | $20,000 |
| Cost of reconditioning to make line permanent | 5,000 |
| Total | $25,000 |
| Total annual cost on investment at 6% | 1,500 |

Cathodic Protection Costs:

Assume that tests have shown that the direct current power required to protect this one mile of line was 5 volts and 25 amperes:

| | |
|---|---|
| Original cost of line | $20,000 |
| Cathodic protection, auxiliary electrode, and service connections complete | 400 |
| Total Investment | $20,400 |
| Giving an annual charge for protected line at 6% | 1,224 |
| A. C. power consumption 2,000 kw. hrs. per year at 5 cents | 100 |
| Inspection and maintenance per year | 50 |
| Depreciation of protective equipment at 5% per year | 20 |
| Total annual charge | $ 1,394 |

The saving in the above case would be $4,600 over the reconditioning cost. The annual charge on the line would be reduced by $106.

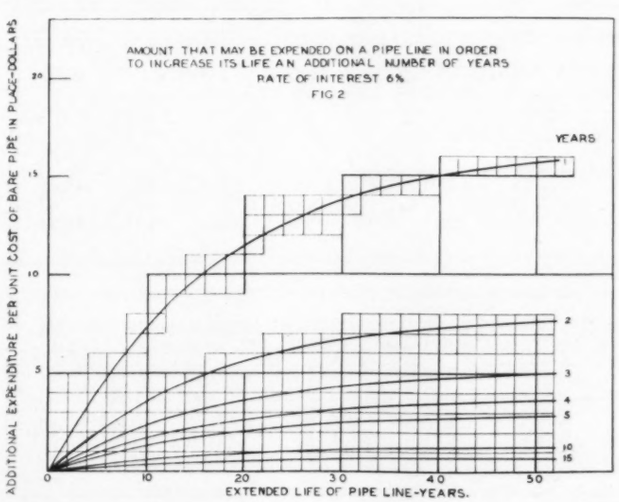
A cathodic installation of this size will usually protect much more than one mile of pipe, so that the investment and annual cost will be considerably reduced. The cost per mile of reconditioning a line cannot be reduced to any great extent.

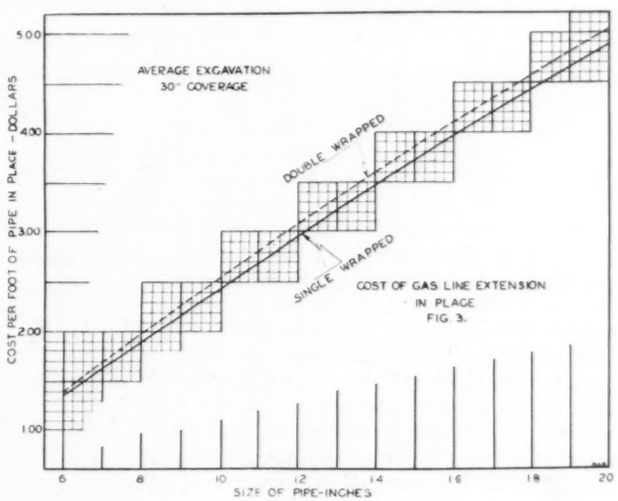
The above comparison is on the assumption that the cathodic protection is permanent and does not deteriorate the pipe covering. After four years of service no deterioration has been found on a 20-inch line 7 miles in length. Both field and laboratory tests covering this question are being made by the Bureau of Tests and Inspection of the Pacific Gas and Electric Co. Work is also being done for the Southern Counties Gas Co. by the Inter-Company Research Committee on "The Effect of Cathodic Protection on Bituminous Protective Coatings." The work is being carried on under the direction of A. B. Allyne.

The cost of installation and maintenance of a cathodic protection installation naturally depends on the local conditions where it is to be applied. If a power line must be installed to the drainage system, this must be added to the cost of the equipment. If the insulation

*(Continued on Page 39)*

* The author is chairman of the Pacific Coast Gas Association's Committee on Pipe Protection; paper was presented before P.C.G.A. Organization Conference, San Francisco, November 24, 1933.


AMOUNT THAT MAY BE EXPENDED ON A PIPE LINE IN ORDER TO INCREASE ITS LIFE AN ADDITIONAL NUMBER OF YEARS
RATE OF INTEREST 6%
FIG 2
YEARS
ADDITIONAL EXPENDITURE PER UNIT COST OF BARE PIPE IN PLACE-DOLLARS
EXTENDED LIFE OF PIPE LINE-YEARS.



# Analyzing Portland Klinker

*By* HAYLETT O'NEILL

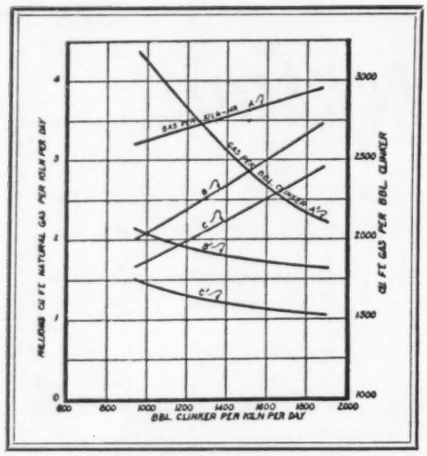



*Fig. 1. Typical Fuel Consumption Curves—1800 Bbl. Cement Kiln.*

A: Poor Operation—Draft Uncontrolled—Straight Kiln.
B: Good Operation—Draft Uncontrolled—Straight Kiln.
C: Good Operation—Kiln Equipped with Chains.

MODERN rotary cement kilns are either fired with pulverized coal, fuel oil or natural gas. All of these fuels being hydrocarbons, are subject to the same general laws of combustion, the difference being determined by the varying proportions of carbon, hydrogen and ash. Nearly all of the larger kilns operate with the slurry or wet process as these make possible more accurate handling and control and mixture of raw feed. While the fuel necessary to evaporate the slurry moisture is considerable, most modern kilns are now equipped with economizer devices such as regenerative chains, which may save as much as 15 per cent of the fuel required by ordinary kilns, and this saving is reflected in lower flue gas temperatures. For example, a certain kiln prior to installation of chains had a flue gas temperature of about 900 degrees; after installing the chains the flue temperature dropped to 600 degrees and the saving was over 15 per cent in fuel.

These chains are suspended in the wet end of the kiln, spirally along the axis so that the flue gases must pass through them. As the kiln revolves they are alternately exposed to the hot gases and dipped into the mud feed. They thus alternately take heat from the gases and by intimate contact transfer this to the mud which is at lower temperature. As the area of the chains is large, the heat transfer may be large. Moreover, the action of the chains breaks up the rather inert mass which the mud forms, so that the gases come into closer contact with the mud. The result is increased evaporation of water and there is less work to be done at the burning end; capacity is increased and fuel saved. Another advantage seems to be that the chains act as baffles and assist in lessening dust losses to the stack. Without such devices, there were many places where high heat content and temperature of kiln gases offered opportunity for economical development of waste heat steam power. But it is obvious that a 600-degree flue temperature prohibits such development. Inasmuch as the economizer device can be installed at less cost than a power plant, it would seem that the possibilities for waste heat power plants in the cement industry are definitely limited.

The purpose of the following discussion is to analyze the various heat losses and their causes in cement kiln operation and indicate a general method for controlling these so as to insure the least fuel consumption or fuel factor.

For example, there is considered a rotary kiln of 1800-bbl. per day nominal capacity per 24 hours with ample chimney draft, fired with natural gas of approximately 1000 B.t.u. (high value) per cu. ft. at atmospheric pressure and ordinary temperature, or 22,200 B.t.u. per lb. The actual firing pressure is 2 lb. gauge, through an inspirator burner supplied with air at 8 oz. pressure. Slurry moisture may vary from 35 to 50 per cent, but averages about 42.5 per cent. Calcium carbonate makes up 75 to 77.5 per cent of the slurry.

The possible causes for variable fuel factor are: Variation in slurry moisture; variation in $CaCO_3$ percentage; variation in heating value of the fuel; variation in weather; variation in degree of burning; variation in rate of feed; variation in gas pressure; variation in fuel-air ratio and mixture; variation in condition of kiln lining.

TABLE NO. 1. SLURRY MOISTURE LOSS

| Moisture % | Lbs. Moisture per bbl. | B.t.u. per bbl. loss at 900 deg. flue gas temp. — No economizer | B.t.u. per bbl. loss at 600 deg. flue gas temp. — with economizer |
|---|---|---|---|
| 30 | 255 | 393,870 | 357,150 |
| 40 | 400 | 558,600 | 520,200 |
| 42.5 | 443 | 618,600 | 576,100 |
| 50 | 600 | 838,000 | 780,400 |

TABLE NO. 2. PRODUCTS OF COMBUSTION FOR GAS ONLY; ZERO SLURRY FEED ZERO EXCESS AIR; LB. OF GASES PER LB. FUEL

| | Fuel | | | | Flue Gas | | |
|---|---|---|---|---|---|---|---|
| Constit's. | Per cent | $H_4$ | C | $N_2$ | $H_2O$ | $CO_2$ | $N_2$ |
| $CH_4$ | 0.98 | 0.245 | 0.735 | 0.02 | 2.205 | 2.70 | 13.09 |
| $N_2$ | 0.02 | | | | | | 0.02 |
| Total | 1.00 | | | | 2.205 | 2.70 | 13.11 |

TABLE NO. 3 WEIGHTS OF PRODUCTS OF COMBUSTION INSOLUBLE IN WATER, LB. PER LB. FUEL. FOR VARIOUS EXCESS AIR PERCENTAGES AND ZERO FEED

| % Excess Air | 0 | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|---|
| $CO_2$ | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| $O_2$ | 0.00 | 0.49 | 0.78 | 1.18 | 1.57 | 1.96 |
| $N_2$ | 13.11 | 14.42 | 15.73 | 17.04 | 18.35 | 19.66 |

# Cement Kiln Burning Operation

*Consulting Engineer*
*Houston, Texas*

Some of these are relatively unimportant, while moisture and dry flue gas losses are large. Hydrogen loss may be large; with gas fuel it is from 11.5 to 12.5 per cent of the total, but depends almost entirely upon the percentage of hydrogen in the fuel. The flue temperature variations affect it only slightly. Once the kiln design is fixed, the principal control of losses lies in proper maintenance of equipment and operation of raw feed, firing and draft control as reflected by the chimney dry gas losses.

*Moisture in Slurry:* About 600 lbs. of dry feed are required per bbl. clinker. Lbs. moisture per bbl.

$$\text{clinker} = \frac{600 \times 100}{(100 - \%\ \text{Moisture})} - 100 = (A)$$

Air temperature assumed at 100 degrees F.
Flue temperature = Tf
Loss, B.t.u. per bbl. clinker =
(A) [+212+32—100+970.4+.48 (Tf-212)]

It is readily seen from Table No. 1 that drying moisture preparatory to burning accounts for about one-third the total fuel as well as taking up a large part of the kiln.

*Variation In Lime Carbonate:* The lime carbonate must be cracked so as to eliminate the $CO_2$, leaving the CaO to be fused with the other solids. To do this requires approximately 1750-degree temperature and about 380,000 B.t.u. per bbl. of clinker. Therefore, the greater the lime content the more fuel is required.

*Variation In Heating Value of Fuel:* Where one class of fuel such as natural gas taken from a large number of wells under control of a load dispatcher is used, there is usually little variation in either the calorimetric value or the hydrogen content.

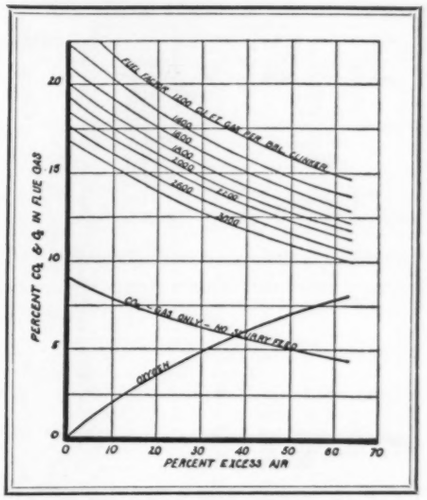



*Fig. 2. Variation of $CO_2$ and $O_2$ with Excess Air for Cement-Burning with Natural Gas.*

*Variation In Weather:* It is certain that changes in humidity as well as temperature affect flue gas losses and radiation slightly. But these losses are hardly under control of the operator. Under average conditions, a drop of 10 degrees in air temperature will raise gas consumption about 7 cu. ft. per bbl. The main effect of barometric changes, and variations in wind velocity and humidity is to change the chimney draft. Unless this is constantly checked and controlled so as to insure correct air-fuel ratios, large losses are sure to follow.

*Variation In Degree of Burning*: If the material feed, fuel feed and air are controlled, the degree of burning will be controlled easily through tests of the raw material and product.

*Variation In Rate of Feed:* The higher the load, the higher will be the rate of flue gas discharge and the higher the temperature of such. Radiation loss will also go up slightly as the length of the high temperature zone of the kiln increases from the firing end. At very light loads, however, the "no-load losses" predominate and it is obvious that at certain ratings, there will be the lowest fuel factor. Usually, a kiln is designed for most economical performance at rated capacity. Consequently every effort should be made to get out full tonnage.

Aside from this point there is an even greater danger from running light. If the operation is so careless as to leave the dampers at light loads with the same opening that gives good performance at high loads, there will be large excess air losses. As the firing temperature must be kept up to insure proper burning, more fuel must be burned to heat the excess air. Thus higher flue gas temperatures and losses are inevitable. Such excess loss may be relatively enormous.

**TABLE NO. 4. VOLUMETRIC PERCENTAGES OF COMBUSTION PRODUCTS FOR ZERO FEED**

| % Excess Air | 0 | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|---|
| $CO_2$ | 11.5 | 10.4 | 9.4 | 8.6 | 7.0 | 7.4 |
| $O_2$ | 0.0 | 2.1 | 3.8 | 5.2 | 6.4 | 7.4 |
| $N_2$ | 88.5 | 87.5 | 86.8 | 86.2 | 85.6 | 85.2 |

**TABLE NO. 5. $CO_2$ OBTAINED FROM LIME IN SLURRY**

| Cu. ft. natural gas per bbl. clinker | Lb. natural gas per bbl. clinker | Lb. $CO_2$ in Lime per bbl. clinker | Lb. $CO_2$ in Lime per lb. nat. gas |
|---|---|---|---|
| 1200 | 56.1 | 204.6 | 3.65 |
| 1600 | 74.8 | | 2.74 |
| 2000 | 93.4 | | 2.19 |
| 2400 | 112.1 | | 1.83 |
| 2800 | 130.9 | | 1.56 |

**TABLE NO. 6. FOR COMBINED SLURRY AND GAS FEED, LB. FLUE GAS CONSTITUENTS PER LB. FUEL ARE AS FOLLOWS FOR A HYPOTHETICAL FUEL RATIO OF 1600**

| % Excess Air | 0 | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|---|
| Total $CO_2$ | 5.44 | 5.44 | 5.44 | 5.44 | 5.44 | 5.44 |
| $O_2$ | 0.0 | 0.49 | 0.78 | 1.18 | 1.57 | 1.96 |
| $N_2$ | 13.11 | 14.42 | 15.73 | 17.04 | 18.35 | 19.66 |

TABLE NO. 7

| Cu. ft. nat. gas per bbl. clinker | Lb. nat. gas per bbl. clinker | Lb. dry feed per lb. nat. gas | Lb. moist per lb. nat. gas | Lb. $CO_2$ per lb. nat. gas | Lb. clinker per lb. nat. gas |
|---|---|---|---|---|---|
| 1200 | 56.1 | 10.7 | 7.9 | 6.35 | 7.0 |
| 1600 | 74.8 | 8.0 | 5.9 | 5.44 | 5.3 |
| 2000 | 93.4 | 6.4 | 4.7 | 4.89 | 4.2 |
| 2400 | 112.1 | 5.3 | 4.0 | 4.53 | 3.5 |
| 2800 | 130.9 | 4.6 | 3.4 | 4.26 | 3.0 |

TABLE NO. 8. B.T.U. PER POUND NATURAL GAS

| Per cent Excess Air | 0 | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|---|
| Dry gas loss | 3570 | 3910 | 4200 | 4500 | 4900 | 5340 |
| Hydrogen loss | 3140 | 3140 | 3140 | 3140 | 3140 | 3140 |
| Heating slurry | 2200 | 2160 | 2100 | 2060 | 2000 | 1960 |
| Dissociation $CaCO_3$ | 4040 | 3950 | 3860 | 3800 | 3700 | 3560 |
| Moisture | 7370 | 7200 | 7070 | 6830 | 6650 | 6500 |
| Clinker sensible heat | 450 | 410 | 400 | 390 | 380 | 370 |
| Undetermined | 1430 | 1430 | 1430 | 1430 | 1430 | 1430 |
| Total | 22200 | | | | | |

In Fig. 1, Curves A indicate variations of gas consumption with rate of feed in an actual operation under faulty control, while Curves B indicate the same with careful control. Curves C indicate further improvement from regenerative chains.

*Variation In Gas Pressure:* Irregular gas pressure with fixed air and feed conditions would result in poor, non-uniform burning or firing results.

*Variation In Air-Fuel Ratio:* The ratio of air to gas determines the losses to the stack and this is the principal controllable loss. In the plant mentioned, it is determined by the blower and burner design and operation, the design and operation of the stack and the condition of the kiln lining, as well as the leakage around the kiln and seal rings.

There are good commercial burners which when supplied with gas and air at ample pressure, will thoroughly mix the two for proper combustion, with practically no CO formation. The air is mixed by radial as well as axial flow, the latter being valuable as the inspirator action of the air and gas assist each other through the nozzle restricted so as to prevent back flares. Secondary air is induced by the stack draft, and usually through the clinker cooler where it picks up a large part of the sensible heat from the hot clinker which would otherwise be lost. While it is necessary to figure on an excess of stack height to compensate for draft loss from unavoidable leakage around the seal rings, barometric and humidity changes or wind variations or temporary restrictions in the kiln such as clinker rings, this excess is controlled by dampers. Such dampers must be of the check type, rather than of the butterfly type, allowing air to enter the base of the stack so as to insure full vent at all loads. Naturally, wind variations must be compensated for constantly. As the damper will be located 200 or 300 feet from the firing operator a remote-controlled damper is advisable. Either a hydraulic or electric motor may be used.

Certain firing conditions as well as chemical composition of the slurry, cause the formation of annular clinker rings. As these grow, the resistance to furnace gases increases, retarding the inflow of air. Therefore the damper should be altered so that the uptake draft can compensate for the resistance.

It is most likely that excess air is largely responsible for rapidity of ring formation. Excess air increases oxidation and fusion with increased turbulance and flame tip temperature. The clinker balls up at the flame tip until it must be shot out or shut down the kiln.

The only accurate means of air-gas control is through the determination of $CO_2$ in the flue gas. For this, a hand Orsat is valuable, but as it requires several minutes to complete a good sample and test, and lots of things can happen between tests, this has definite limitations. Moreover, hand testing costs money.

A continuous sample is desirable. Provided the sample is thoroughly scrubbed, a thermal conductivity analyzer is satisfactory with the sample cell located at the discharge of the kiln and the indicator or recorder at the burner end. For convenience, stack temperature can be recorded at the same time on the same instrument. It is advisable to wet-scrub the sample, pass this through a small steam separator and pass through a dry dust filter before admitting to the regular instrument porcelain filter in the instrument proper.

In order to illustrate the relation of $CO_2$ to firing efficiency, calculations were made for both 75 and 77.5 per cent $CaCO_3$. Figure 2 shows the variations in $CO_2$ with excess air for various fuel factors. The $CO_2$ percentage depends not only upon the lime content, but upon the combustion of carbon in the fuel. The lower the fuel factor, the greater will be the percentage of $CO_2$. There is not a great deal of difference indicated by varying percentages of carbonate in this range. Calculations are as follows:

*Analysis of natural gas by weight:*

$CH_4 = 0.98$.
$N_2 = 0.02$.
B.t.u. per lb. (high) = 22,200.
Lb. dry mix per bbl. clinker = 600.
Slurry moisture = 42.5%.
Lb. lime per bbl. slurry = $0.775 \times 600 = 465$.
Per cent $CO_2$ in $CaCO_3 = 44$.
Lb. $CO_2$ per bbl. clinker = $0.44 \times 465 = 204.6$.

Tables were calculated for other fuel ratios and the composite calculations were plotted in Fig. 2. It can be shown that for 75 per cent $CaCO_3$ slurry, the results will not vary from the above materially.

In order to show the effect of excess air as indicated by $CO_2$ percentage, upon the heat losses, Table No. 7 was calculated for 77.5 per cent $CaCO_3$.

Fig. 3 shows losses per lb. fuel calculated in heat balance for various excess air percentages for 77.5 per cent $CaCO_3$. They are calculated as follows:

Temperature flue gas.....900 deg. F.
Temperature air and feed.....100 deg. F.
Per cent slurry moisture.....42.5
Hypothetical fuel ratio.....1600
Per cent excess air..... 20

Lb. lime per lb nat. gas $\frac{465}{74.8}$ .....6.21

Lb. dry flue gases per lb. fuel gas 21.95
Weight of moisture from burning hydrogen per lb. fuel gas.....2.205

*(Continued on Page 40)*

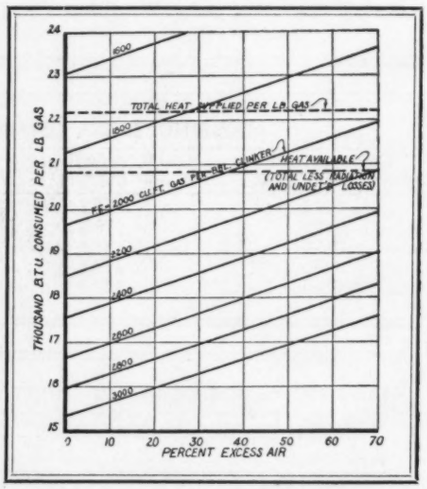



*Fig. 3. Heat Consumed per Lb. Natural Gas in Burning Clinker—1800 Bbl. Cement Kiln (Flue Temperature=900° F.)*

# Results *from* Three Years *of* Safety Work *on* United Gas System

By J. C. FLANAGAN

*Assistant to President, United Gas System Houston, Texas*

*REDUCTION in accident severity and frequency, lowered accident costs, promotion of a unified company attitude among employees—these are among the direct benefits of the United Gas System's safety program. Mr. Flanagan tells how the United plan operates, in the present article. His description was originally published under the title, "Can Accident Cost Be Controlled in the Natural Gas Industry?", in the Executives Service Bulletin of the Metropolitan Life Insurance Co. for November, 1933.—Editor.*

*J. C. Flanagan*

WHEN the group of natural gas properties known as the United Gas System came under the control of United Gas Corp. in June, 1930, the properties included natural gas production in 31 fields, approximately 4,000 miles of main transmission pipe lines and local gas distribution systems in 89 cities and towns. The territory covered by these operations comprised considerable parts of Texas and Louisiana, and part of the Republic of Mexico. Also included in the group was some oil production in several fields in southeast Texas.

The properties had been in the process of rapid expansion and, during the ensuing two years, extensions were completed and acquisitions made that materially increased the size of the properties and enlarged the territory covered to include the State of Mississippi and portions of Alabama and Florida. Operations include the production, transmission and distribution of natural gas, extraction of natural gas gasoline, operation of large gas compressor stations and the production of crude oil. The topography of the territory covered varies greatly and includes practically every kind of natural hazard likely to be encountered by any natural gas operating unit in the construction and operation of a widespread business.

One of the many problems confronting the new organization was that of excessive occupational accidents. Practically every operating company included in the group had a bad accident record. Some were worse than others but the experience record for the group was very unfavorable. None of the companies had any organized accident prevention program and in very few was any effort being made to promote safety and reduce accidents.

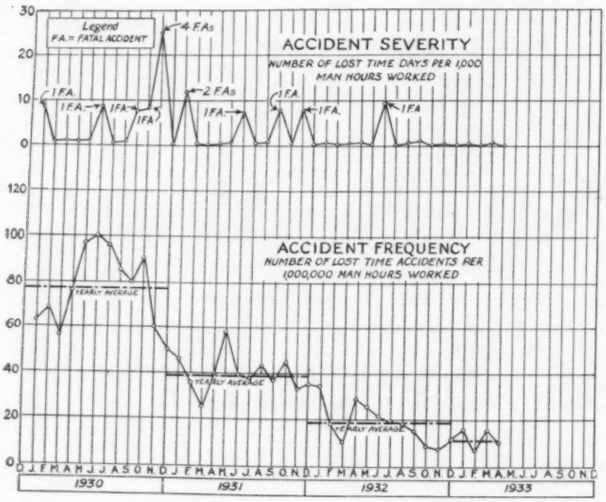
The new management determined to make an intensive effort to control its accident cost. Accordingly, in September, 1930, an experienced safety engineer and a medical director were employed. A safety department was set up in the organization and a comprehensive accident prevention and safety educational program was mapped out. The work presented many difficulties. The extent of the territory covered the combining and adjusting of many different groups of operating departments, and the rapid expansion which was still in progress all tended to increase the natural operating hazards. Added to this was the fact that very few of the employees had had any training or education in safety or accident prevention work.

In analyzing the problem it was realized that in order to secure permanent, satisfactory results, it would be necessary to educate every employee of the company, particularly those in the operating departments, in safety and accident prevention work. Fortunately, it was not necessary to sell the executives, as their hearty co-operation and backing was given to the movement from the beginning. Many of the operating superintendents and department heads were also convinced from the first that the accident prevention program could be made an important part of the operations and they aided materially in carrying out the program and assuring its success.

Our experience indicates that in the control of accident cost, three major factors are involved: (1) physical examinations, (2) safety and accident prevention activities, (3) supervision and control of medical cost.

One of the first steps in our program was the requirement that all employees undergo a physical examination by company physicians, the cost of which was paid by the company. A rule was made that all applicants for employment must pass satisfactory physical examinations before being employed, the cost of which is also borne by the company whether or not the applicant is given employment. In the examination of our employees, none was released on the basis of physical defects revealed. On the contrary, many employees were advised of physical ailments of which they had been in total ignorance and, if necessary, were aided in securing proper medical treatment. Physical examination blanks were prepared in the safety department and issued to company physicians and key-men of the organization with complete instructions for their use. We have adhered rigidly to the requirements of physical examination and it is believed that considerable credit is due this feature of our program for the results that have been attained in reducing our accident cost.

Under the direction of the safety engineer, Safety Councils were organized at strategic points in our operations. The operating district lines were fol-


Legend
FA.= FATAL ACCIDENT
ACCIDENT SEVERITY
NUMBER OF LOST TIME DAYS PER 1,000 MAN HOURS WORKED
4 FAs
2 FAs
1 FA
ACCIDENT FREQUENCY
NUMBER OF LOST TIME ACCIDENTS PER 1,000,000 MAN HOURS WORKED
YEARLY AVERAGE
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932
1933

Accident severity and frequency curves, United Gas System Properties—December, 1930, to April, 1933

lowed as closely as possible in the formation of the Safety Councils and plans were made for each Council to hold regular monthly safety meetings. Through these safety meetings and by personal contact, all employees were given practical instruction in the fundamentals of safety and accident prevention. The hazards of each operation were disclosed and methods of eliminating or mitigating them were discussed. Assistance of the United States Bureau of Mines was obtained and practically every employee in the operating departments has received Bureau of Mines First Aid Instruction and secured the Bureau's certificate.

*Accidents Analyzed*

At each monthly meeting, the accidents occurring during the past month are reviewed, the cause of each accident is determined and suggestions made for preventing similar accidents in the future. The extent to which the employees have become imbued with the desire for safety in their work is strikingly revealed in the manner in which each accident is reported and discussed. In the beginning, the men were slow to report accidents and reluctant to fix the blame on or to criticize a fellow employee. Gradually this attitude was changed until in reviewing an accident no effort is spared to determine its cause, and the blame is fixed where it properly belongs, without regard for personal feeling. All employees are constantly on the alert to discover physical hazards and, as far as possible, to eliminate them. The safety engineer consults with the operating superintendents relative to the selection of safe operating tools and equipment and every operation is rendered as safe as possible consistent with practical operating conditions.

An important factor in the control of accident cost, particularly after the number of severe accidents has been materially reduced, is the control of medical cost. This is accomplished in our organization by close cooperation between our medical director and our safety engineer. Physicians have been selected at various points in our operations with a view of providing expert medical attention for an injured employee, in the shortest possible time. These appointments are made with considerable care and complete understanding is had with the physician relative to physical examinations, treatment of injured employees, fees, etc. Close contact is maintained between the key-men of the organization and the company physicians at each location. Our medical director and safety engineer collaborate in appointing and supervising the entire medical staff and review the treatments rendered injured employees. Thus, our employees are assured adequate medical treatment at rates that are satisfactory to the company and to the physicians rendering the service.

It is believed that the general health of our employees has a direct bearing on the efficiency and safety of our operations. Our medical director supervises all general operations to see that sanitary working and living conditions are maintained, especially where employees work in groups, as at compressor stations, gasoline plants, etc.

*Results of Safety Work*

Realizing that accurate knowledge of all factors involved in the matter of accident cost control was essential to the success of the program, provision was made for the assembling of complete, detailed figures in the safety department. The graph shown as Fig. 1 is one of a number compiled from these records, and indicates some of the results obtained.

The reduction in number, severity, frequency and cost of accidents has been gratifying but other benefits have resulted which were not anticipated. The monthly safety meetings, which are attended by practically all employees and usually presided over by the district managers, have provided a means by which the employees in the different operating departments have become well acquainted, and have in a large measure promoted a feeling of unity, not only among the employees in each operating district, but between the operating districts of the entire United Gas System. Operating problems and ideas are exchanged among the various districts and suggestions for improving operating efficiency are conveyed to the entire organization with the least delay in the most effective manner. We believe that the safety meetings have assisted materially in consolidating our wide-spread operating units into a close knit and efficient organization.

## 1934 Calendar

### January

*Southern California Meter Association*—Long Beach, Calif., January 25.

*National Bottled Gas Association*—Waldorf-Astoria, New York, N. Y., January 24.

*Compressed Gas Manufacturers' Association, Inc.*—Waldorf-Astoria, New York, N. Y.; January 25-26.

### February

*Eastern Natural Gas Regional Sales Conference (A.G.A.)*—William Penn Hotel, Pittsburgh, Pa., February 8-9.

*8th Mid-West Regional Gas Sales Conference (A. G. A.)* — Hotel Sherman, Chicago, Ill., February 15-16.

### March

*Oklahoma Utilities Association*—16th Annual Convention, Tulsa, Okla., March 6-7.

*Southern Gas Association, Southern Regional Sales Conference (A.G.A.) and Southwestern Regional Sales Conference (A.G.A.)* — Joint Meeting, Memphis, Tenn., March 21-23.

### April

*Mid-West Gas Association* — Sioux City, Iowa, April 16-18.

### May

*Natural Gasoline Association of America*—Tulsa, Okla., May 9-11.

*International Petroleum Exposition*—Tulsa, Okla., May 12-19.

### June

*Canadian Gas Association*—27th Annual Convention, Windsor Hotel, Montreal, Canada, June 4-5.

### October

*American Gas Association* — 16th Annual Convention, Atlantic City, N. J., Week of October 29.

# Auxiliary Appliances Get Attention in *This* Program

SUMMARIZING the course of sales development in most gas companies the general manager of a natural gas property serving a number of communities in the Southwest offers a well supported opinion that "We have not paid much attention to the development of loads by increased utilization."

For his own company (Empire Southern Gas Co.) F. A. Coughlin has decided that a part of the answer lies in realizing upon sales possibilities for auxiliary gas appliances among domestic and commercial users.

In a recent communication to district managers he gives an excellent analysis of the whole problem and draws a few comparisons with the electric industry—comparisons which reflect not at all well upon gas company sales policies.

As Mr. Coughlin sees it, the sales departments of many natural gas utilities have coasted along in recent years on the momentum built up by rapid acquisition of new territory through line extensions and construction of new distribution systems. On such properties it has been quite logical to first skim the cream represented by cooking, water-heating and househeating loads. But the time is past when any sort of cream-skimming sales policy will allow the gas utility to maintain its competitive position. It is not necessary to go beyond the A. B. C. of gas sales economics to realize that advancement today lies along the road of increased utilization within existing territory. New consumers must be added on sparsely served extensions. No opportunity must be ignored for building up present gas customer's loads, even though the items added be in themselves insignificant from a revenue-building standpoint.

Preliminary to discussing this problem with his districts Mr. Coughlin made a rather complete investigation of the available small appliances for promotion of gas among domestic and commercial customers. More than 100 manufacturers of gas appliances were contacted and the results were discouragingly meager.

There are all too few supplementary appliances now on the market, but gas utilities have themselves to blame since they have allowed the market for these appliances to lie dormant to a great degree.

Mr. Coughlin is asking his district staffs to "Walk down the street, stop at your competitor's, and note the wide variety of appliances he carries. Note also the number of these which are certainly inconsequential from a load-building standpoint. . . . Observe the number of similar appliances which are displayed by other merchants, also the number of establishments devoted almost exclusively to the sale of these appliances. The accumulative effect of the sale of all of these is enormous and tends to make the customers think but one way when faced with a choice as between our appliance and that of our competitor." And he further brings home the responsibility for auxiliary appliance development by asking his districts "What do you employ for lighting, for ironing, for your toaster, waffle iron, percolator?"

The answer to the last question, for a good percentage of gas companies would certainly not be "gas"—yet where can the industry look for 100 per cent use of its product if not to its own personnel?

Apathy has led to this situation, in Mr. Coughlin's opinion. True enough, the electric industry brought forth superior appliances for some auxiliary loads, but gas companies are reaping the results of their own neglect to encourage development of competing appliances and to promote the several excellent auxiliary appliances now on the market.

Although the fact is not sufficiently appreciated, the sale of auxiliary equipment has a cumulative effect in making gas or its competing fuels indispensable. As Mr. Coughlin forcefully phrases it, with respect to the many available electric "gadgets"—"Such appliances instill in the customers a consciousness of their product which has permitted them to invade to an appreciable and marked extent that portion of our market which we have believed to be sacrosanct, e.g., heating, and particularly cooking and water heating. It seems inconceivable to us that they should be able to persuade any customer having access to gas to use or continue to use their product for cooking or water heating. The fact remains, however, that they are doing it today."

Several examples are offered by Mr. Coughlin of failure to promote highly efficient gas equipment already available to the industry. Few companies, he states, stock or exhibit gas-heated instrument sterilizers on their sales floor or even have manufacturer's literature on file for this equipment. He gives the instance of a company serving a community large enough to maintain an office building tenanted exclusively by doctors and dentists. The management of this building supplied natural gas free to each office, and water and air under pressure were also included free. Electricity, however, was supplied through individual meters. Every office in this building has one or more sterilizers, yet only two of them utilize gas and both of these are antiquated models. The instance above would apply in greater or lesser degree to gas-air torches suitable for dentists, tinsmiths, garages, jewelry shops; lighters and sandwich toasters for drug stores; singeing torches for butcher shops; vulcanizers for filling stations; and on through the list of auxiliary equipment.

ON the Empire Southern Gas system this problem of intensively promoting sales of auxiliary equipment is to receive due consideration in 1934. Gas will be sold as a year-'round all-purpose fuel. Until adequate appliances can be obtained through manufacturing channels the company in some cases will attempt to improvise equipment and thus obtain definite data with which to interest some aggressive manufacturer.

While the observations above regarding the neglect of the supplementary appliances do not apply to all companies, those utilities which do have aggressive policies for cultivating this market are the exception rather than the rule throughout the industry. More company managements would do well to follow Mr. Coughlin's example and direct the thought of their co-workers toward

*(Continued on Page 39)*

# Pacific Coast Gas Association

Managing Director: Clifford Johnstone
Association Headquarters:
447 Sutter Street, San Francisco

President: George P. Egleston
General Manager, H. R. Basford Co.,
San Francisco


## National Gas Appliance Code Supersedes State Code

THE Code of Fair Competition sponsored by Gas Appliances Institute, which became effective on December 7, 1933, completely supersedes the California State Codes in the opinion of the Attorney General of California. In view of the complete absence of enforcement machinery for California codes this is probably a happy solution of the difficulties encountered by the Manufacturers Section of the Pacific Coast Gas Association in its attempts to stabilize the gas appliance business through the state law.

Machinery is now being perfected through which to enforce the National code. Coast manufacturers and distributors will work through the Pacific States Division of the Gas Appliances Institute. George E. Frazer of Frazer and Torbet, confidential agent for the code authority, visited the Coast in December and addressed meetings of manufacturers in San Francisco on December 12 and in Los Angeles on December 14. He announced that the Administration Committee for the Pacific Coast Territory would be as follows:

C. R. Graham, Jas. Graham Mfg. Co., Newark.

W. J. Bailey, Day and Night Water Heater Co., Monrovia.

E. L. Payne, Payne Furnace and Supply Co., Los Angeles.

L. Cinq-Mars, Pacific Gas Heating Co., San Francisco.

J. M. Williams, Williams Radiator Co., Los Angeles.

Mr. Frazer explained the code in some detail and stated that if financial support to Gas Appliances Institute from the Pacific Coast would permit, he hoped to be represented on the coast by both a business office and a local firm of certified public accountants.

A review of Mr. Frazer's explanation of the code, and the full text of the code itself, appear elsewhere in this issue.

## Association's Research Fellowship Renewed

The Research Fellowship in Gas Engineering maintained by the Association at the University of California will again be offered for the school year beginning in August, 1934. This fellowship is offered to graduates of Pacific Coast Universities and engineering colleges, the selection of a fellow being made from among available candidates by a committee consisting of Dr. C. B. Lipman, dean of the Graduating School of the University; Dr. B. M. Woods, chairman of the Department of Mechanical Engineering, and W. S. Yard, vice-president, Pacific Gas and Electric Co.

The present holder of the fellowship is G. R. MacPherson, a graduate of the University of California in Mechanical Engineering. He has undertaken a study of the heat transfer factors which affect the performance of unit coolers. This work has an important bearing on air-conditioning. Other investigations recently completed or under way at the University include the following:

Heat Transfer Factors in a Unit Gas Heater—A. G. Foote.

A study of the Stability Limits of Natural Gas Flames—Hugh H. Hyde.

Air Infiltration through Steel Framed Windows—D. O. Rusk, V. H. Cherry and L. M. K. Boelter.

Friction Factor for Non-Isothermal Low Velocity Flow Through Tubes—V. H. Cherry.

## Technical Conference

F. A. Hough, general chairman of the Technical Section, has announced that the annual Spring Conference of the Section will take place in Los Angeles, on Thursday and Friday, March 22 and 23. It is hoped that a number of subcommittees will have completed their assignments in time for presentations and discussion by the Conference. Other committees will make preliminary reports.

Similar spring conferences will be held by other Sections on dates to be announced later.

### El Paso Natural and Western Gas Co. Add Executives

PAUL Kayser, president of the El Paso (Texas) Natural Gas Co., and H. G. Frost, vice president and general manager in December announced appointment of C. C. Cragin as vice-president and assistant general manager of the company. A. L. Forbes, Jr. becomes vice-president of the Western Gas Co., El Paso, Texas, affiliate of El Paso Natural.

Mr. Cragin is a graduate in civil engineering of New York University and a member of the American Society of Civil Engineers. From 1920 to 1933 he served as chief engineer and general manager of the Salt River Valley Water Users' Association, Phoenix, Ariz., designing and directing the entire irrigation and power development project.

A. L. Forbes, Jr. has been general superintendent of Western Gas Co. operations since the company's organization in 1930 and has been in charge of its construction program. He will supervise operations on the 725-mile line from the gas fields in New Mexico to Phoenix, Ariz.

H. G. Frost, vice-president and general manager of the El Paso Natural Gas Co., will continue in general charge of the company's operations through Mr. Cragin and Mr. Forbes.

### P. G. and E. Opens Los Gatos—Saratoga Line

A new 4-inch natural gas main from Saratoga to Los Gatos, Calif., has been put into service by the Pacific Gas and Electric Co., San Francisco, Calif., providing residents of Glen Una and Austin Corners with natural gas for the first time. The new pipe line serves as a link between San Jose-Los Gatos and San Jose-Saratoga lines, and will give Los Gatos an additional supply for winter demands. The line parallels the Los Gatos-Saratoga highway for the entire distance.

### Portland Gas & Coke Franchise Repeal Is Denied

The Senate of the State of Oregon on December 9 defeated by a vote of 25 to 5 a bill providing for the repeal of the Portland Gas & Coke Co.'s perpetual territorial franchise. Repeal would have permitted the city of Portland to arrange a new franchise which would impose a tax of 5 per cent on the gross revenue of the corporation.

# Gas Appliances and Apparatus Code in Force

(Continued from Page 10)

be no less than such employee would be entitled to receive if the compensation were measured by time rate.

The principle of equal rates of pay for male and female employees under like conditions of employment, performing substantially the same work is accepted herein; and, where female employees are used to replace male employees performing certain classes of work such female employees shall be paid the rates of pay in effect for the male employees at the time of such replacement.

On and after the affective date, the minimum wage that shall be paid by any employer to all other employees, except commission sales people and all employees covered by Section 4, Paragraphs 1, 2, and 3, shall be not less than at the rate of $15.00 per week.

Office boys and girls shall be exempted from the provisions of this Section, provided they are paid at the rate of not less than 80% of the above minimum wages, and provided that they do not exceed in number more than one to every ten office employees.

### Hours

On and after the effective date employers shall not operate on a schedule of hours of labor in excess of 40 hours per week per employee.

Provided, however, that these limitations shall not apply to branches of this Industry in which seasonal or peak demands or breakdowns place an unusual and temporary burden upon such branches; and that in no case shall the hours worked in any one week exceed 48 hours during such seasonal or peak periods; and

Provided, further, that the number of excess hours worked in any six (6) months' period, without the payment of overtime, may not exceed 32 hours, in the case of employees engaged in the processing of products in the Industry and labor incident thereto; and may not exceed 48 hours, in the case of all other employees except executive, administrative, and supervisory employees who receive $35.00 or more per week and outside salesmen, commission salesmen, and service men; and

Provided, further, that any employee at the request of the employer may work additional hours beyond those specified in the two preceding paragraphs, provided such additional hours shall be paid for at the rate of time and one half. Employees working more than eight hours in any 24-hour period shall be paid time and one half for all time in excess of eight hours during such period.

No employee shall knowingly be permitted to work in the aggregate in excess of the above prescribed number of hours irrespective of whether such employee be on the pay roll of more than one employer; and

Provided, further, that nothing in the foregoing employment provisions shall apply to executive, administrative, and supervisory employees who receive $35.00 or more per week; and outside salesmen.

### General Labor Provisions

It is understood, however, that old and partially disabled employees are not included in the above labor provisions, except that they shall in no case be paid less than 80% of the above minimums, and provided that the total number of such employees shall not exceed two employees in plants having less than 100 employees; nor more than 2% of the total number of employees in such plants employing 100 or more.

It is further understood that watchmen are not included in the hours provisions of this Article, except that in no case shall they be permitted to work longer than 56 hours in any one week unless they are paid time and one half for any hours in excess of 56 hours per week.

Employers shall not reclassify employees, or duties, or occupations of employees so as to defeat the purposes of this Act.

## ARTICLE V—CHILD LABOR

Employers shall not employ or permit to be employed any person under the age of sixteen (16) years, provided that no person under the age of eighteen (18) years shall be employed in a hazardous occupation and provided, further, that where a State Law specifies a higher minimum age, no person below the age so specified by such State Law shall be employed within that State.

## ARTICLE VI—ADMINISTRATION

1. *Agency for Administration.*—The agency for administering, supervising, and promoting the performance of this Code by the Gas Appliances and Apparatus Industry, shall be the Gas Appliances Committee. The membership of the Committee shall include the members of the Governing Committee of the Institute. In addition thereto (a) the Administrator may cause an election to be held under regulations, prescribed by the Administrator, for the selection of a member of this Committee by employers of the Industry who are not members of the Institute, provided that in any such election members eligible to vote be employers accepting the proper pro rata share of the cost and responsibility of administering this Code as defined in Article VII hereof, (b) also, the Administrator may appoint not to exceed three members, without vote, to serve with the Gas Appliances Committee in its administration of this Code. Such members if and when appointed shall serve for a term of from 6 months to 1 year and their appointments shall be so arranged that they do not expire at the same time, and such members shall serve without expense to the gas appliances industry.

2. *Functions of the Agency.*—The Committee is appointed the agency for the Industry and for the following purposes:

(a) To collect, compile, and distribute such data and statistics as may be required under this Code, or as may be requested by the Administrator, or, in the opinion of the Committee, are pertinent to effectuate the National Industrial Recovery Act and to require such records in the offices of the members of the Industry as may be necessary or advisable in procuring or furnishing such data or statistics; such information shall be confidential, except insofar as disclosure may be necessary for the effective administration and enforcement of the Code.

(b) In addition to information required to be furnished to the Committee, there shall be furnished to government agencies such statistical information as the Administrator may deem necessary for the purpose recited in Section 3 (a) of the National Industrial Recovery Act.

(c) To represent the Industry in conferring with the administrator with respect to the application of this Code and of said Act and of any regulations issued thereunder, and further to represent the Industry in filing amendments or supplementary provisions to this Code or additional Codes, with the Administrator, and the representation of the Industry at public hearings.

(d) To cooperate with the Administrator and other proper government officials in the administration and enforcement of this Code.

(e) To hear, determine, and settle complaints between members of the Industry.

(f) To hear complaints from employers and employees in the Industry and if possible to adjust the same.

(g) To perform such other acts as may be necessary or proper to enable the Industry to function under this Code and under the National Industrial Recovery Act.

## ARTICLE VII—PARTICIPATION

SECTION 1. *Membership in Institute.*—Membership in the Gas Appliances Institute shall be open to all employers in the Industry and no inequitable restrictions shall be imposed upon admission to membership.

SEC. 2. *Cost of Administration.*—Any employer subject to the jurisdiction of this Code and receiving the benefits of the Code and/or the benefits of the activities of the Committee shall pay to the Committee his equitable proportionate share of the expense of formulating and putting into effect and administering this Code, and any other costs which may be incurred in the preparation and/or administeration of the Code by said Committee. The part of such expenses which shall be assessed against such employers shall be assessed by the Committee, which Committee in making such assessment shall take into account the number of employers, the volume and class of business, and an equitable consideration of any and all matters which should be taken into account in determining the proper assessment.

Failure of any assenting employer to pay any such assessment for a period of thirty days after the date on which it shall become payable shall entitle the Committee to deprive such employer of his participation in the administration of the Code as therein or herein provided, and such employer shall continue to be liable for his proportionate share of all due and unpaid assessments.

## ARTICLE VIII—BASES FOR PRICES

No employer shall sell or exchange any product of his manufacture at a price or upon such terms or conditions that will result in the customer paying for the goods received less than the cost to the seller, determined in accordance with the standard method of accounting to be prescribed by the Committee, subject to the approval of the Administrator; provided, however, that dropped lines, seconds, or inventories which must be converted into cash to meet emergency needs may be disposed of in such manner and on such terms and conditions as the Committee and the Administrator may approve and as are necessary to move such product into buyers' hands, and provided further, that selling below cost in order to meet existing competition on products of equivalent design, character, quality, or specifications shall not be deemed a violation of this Article if provision therefor is made in supplemental codes hereafter prepared for any branch or subdivision of the Industry.

## ARTICLE IX—SALES PRICES AND TERMS

Each employer shall publish and file with the Committee his sales prices and terms.

Such sales prices and terms may provide reasonable differences as to:

(a) Export Sales.
(b) Sales to Large Purchasers.
(c) Sales to Wholesalers, Jobbers, and Brokers.
(d) Sales to Retailers.
(e) Direct Sales to Consumers.

The published sales prices and terms of any employer applicable to one class are not applicable to any other class, and if so used shall be a violation of this Code. Sales terms shall be published by each employer to the Committee under rules estabished by the Committee.

On and after the effective date, no employer shall offer any product of the Industry for sale at less than his published sales prices and terms except as provided in Article VIII.

### ARTICLE X—TRADE PRACTICES

The practices and methods as set forth in the following paragraphs 1 to 12, inclusive, including the subparagraphs thereof, in this Article X, are hereby designated as unfair methods of competition, and indulgence by any member of the Industry in any of the same shall be violation of this Code:

(1) Making any agreement or contract after the effective date of this Code the effect of which will amount to the sale and/or delivery of gas appliances on consignment; provided, however, that this sub-section shall have no binding force and effect as applying to contracts existing prior to the approval of this Code.

(2) Allowing terms of payment other than those stated in the published sales terms of each employer except as otherwise provided herein.

(3) Selling or offering to sell any merchandise with a repurchase agreement.

(4) Allowing the return of merchandise at other than the fair market value at the time of its return, except merchandise having manufacturing defects may be returned for full credit.

(5) Purchasing or allowing credit for second-hand merchandise at an amount greater than its fair market value.

(6) Using premiums in the sale of merchandise.

(7) Giving gratuities or making payments to any employee or agent of a customer or prospective customer.

(8) Selling or offering for sale any article containing false marking or branding with the intent or the effect of misleading or deceiving purchasers with respect to rating, quality, grade, or substance of the merchandise.

(9) Defaming competitors by falsely imputing to them dishonorable conduct, inability to perform contracts, questionable credit standing, or other false representations or the false disparagement of the grade or quality of their products for the purpose or with the effect of misleading or deceiving purchasers or prospective purchasers.

(10) Using excessive inducements or entertainment or other practices for their agents, dealers, or distributors which tend to add unduly to sales costs.

(11) Imitating or simulating any trade mark, trade name, slogan, or other marks of identification of a competitor, having the tendency and capacity to deceive or mislead purchasers or prospective purchasers.

(12) So long as the maker of any trademarked "Gas Appliance" (or his successor in business) continues to make and supply repair parts therefor, it shall be an unfair method of competition for any other person to make and supply repair parts for such "Gas Appliances" unless (a) the name of the maker of such repair parts is plainly marked on each part (or if this is impracticable on the package or tag) and unless (b) said parts are otherwise marked, packaged, and sold without imitative labels, and in such a manner as to clearly indicate to the ultimate user that they are not made by the maker of the original "Gas Appliance."

### ARTICLE XI—POWERS RESERVED TO THE PRESIDENT

1. This Code and all the provisions thereof are expressly subject to the right of the President, in accordance with the provisions of Clause 10 (b) of the National Industrial Recovery Act, from time to time, to cancel or modify any order, approval, license, rule, or regulation, issued under Title I of said Act, and specifically to the right of the President to cancel or modify his approval of this Code or any conditions imposed by him upon his approval thereof.

### ARTICLE XII—GENERAL PROVISIONS

1. *Amendments.*—Such of the provisions of this Code as are not required by the National Industrial Recovery Act to be included herein may, with the approval of the President of the United States, be modified or eliminated as changed circumstances or experience may indicate. This Code is intended to be a basic code, and study of the trade practices of the gas appliances and apparatus industry will be continued by the Committee with the intention of submitting from time to time, additions to this Code applicable to all employers in the gas appliances and apparatus industry and supplemental codes applicable to one or more branches or subdivisions or product classifications of the gas appliances and apparatus industry; such supplemental codes, however, to conform to, and be consistent with, the provision of this code as now constituted or hereafter changed:

2. *Monopolies not encouraged.*—No provisions in this Code shall be interpreted or applied in such manner as to:

(a) Promote monopolies or monopolistic practices;
(b) Permit or encourage unfair competition;
(c) Eliminate or oppress small enterprises; or
(d) Discriminate against small enterprises.

3. *Restriction of Liability.*—Nothing contained in this Code shall be deemed to constitute the members of this Code partners for any purpose.

4. *Application of the Code.*—If any employer in this Industry is also an employer in any other industry, the provisions of this Code shall apply to and affect only that part of the business of such an employer which is a part of the Industry covered by this Code.

5. *Approval of the Administrator.*—All action taken by the Committee in the administration of the Code shall be subject upon review by the Administrator to his disapproval or modification.

## Wright and Carmichall Advanced in Lone Star System

IMPORTANT executive personnel changes were announced January 1 by two of the largest distributing companies of the Lone Star Gas System. Wesley F. Wright, formerly general manager of the Fort Worth Division of the Lone Star Gas Co., was elected vice-president and operating manager of the Dallas Gas Co. He was succeeded in Fort Worth by F. L. Carmichall, formerly general superintendent of the Community Natural Gas Co., also a member of the Lone Star Gas System. Mr. Wright also will be general manager of distribution in the Fort Worth-Dallas area.

*Wesley F. Wright*

*F. L. Carmichall*

Mr. Wright was previously with the Dallas Gas Co., having come from Indiana in 1910 to join the company. He was superintendent of distribution when he left in 1929 to become general manager in Fort Worth. He succeeds R. G. Soper who was elected president and general manager of the Dallas concern following the death of the late Henry C. Morris.

Leaving the Graver Corp. of Chicago, Ill., in 1925, Mr. Carmichall came to Texas and joined the Dallas Gas Co., a year later entering the engineering department of the Community Natural Gas Co. Participating in the construction of many of the Community's 250 town plants, he was appointed general superintendent January 1, 1928.

## Oskaloosa, Iowa Changes To Natural Gas Service

In preparation for change-over to natural gas, Iowa Power & Light Co., Des Moines, Iowa, has under construction an 11,000 foot 3-inch welded steel pipe line into Oskaloosa, Iowa, from the 24-inch line of the Natural Gas Pipeline Co. of America. The latter company will extend its high pressure line south towards Oskaloosa, and new metering and pressure reducing facilities will be installed to serve the community. Gas will be odorized for distribution in Oskaloosa.

Iowa Power & Light Co., formerly served 1500 meters in Oskaloosa with a carburetted water gas of 500 B.t.u. The community has a population of 10,000.

## Largest Customer Acquired by San Joaquin L. & P. Corp.

Late in 1933 the San Joaquin Light and Power Corp., Fresno, Calif., completed a 3-mile natural gas pipe line extension from Merced to the Yosemite Portland Cement Co., bringing service to its largest consumer. The plant has an estimated annual consumption of approximately 500,000,000 cubic feet, and is equipped to operate two kilns in which raw cement is treated prior to being ground and packed for shipment. At present the plant is operating one kiln with a 1200-barrel klinker day, using approximately 63,000 cubic feet of gas per hour.

COMMITTEE:
DOUGLAS BUCKLER...SO. CALIF. GAS CO.
J. EARL JONES.....SEATTLE GAS CO.
A. C. JOY (CHAIRMAN).....P. G. & E.
D. L. SCOTT.....L. A. G. & E. CO.
PIERRE VINET.....C. C. G. & E. CO.

1934 P·C·G·A·

HEADQUARTERS:
PACIFIC COAST GAS ASSOCIATION
447 SUTTER STREET, SAN FRANCISCO

GEO. P. EGLESTON, PRESIDENT
CLIFFORD JOHNSTONE, MNG. DIRECTOR

CO-OPERATIVE LOAD-BUILDING MONTHLY NEWS AND VIEWS

# Coastwide Campaign Will Continue for Fifth Consecutive Year

GEO. P. EGLESTON
*President*
*Pacific Coast Gas Association*

**THE Gas Industry of the Pacific Coast is to be congratulated upon its decision to continue its cooperative advertising. Approval has been received from participating gas companies of a 1934 schedule in 20 leading trade and technical journals.**

*Mr. Egleston*

**Thus is assured another year of the program which has now been carried on continuously for 52 months. A record which we believe is unapproached by any similar undertaking within our industry anywhere in the United States. In fact, only a few other industries (notably the orange growers, walnut growers and florists) have maintained a united advertising front for five years or more. More proof that Pacific Coast gas men *can* and *do* cooperate; another strong link in the splendid, unbroken chain of achievements of our Association!**

## TECHNICAL NEWS SERVICE

**Our Technical News Bureau (which employs Jas. R. Ferguson as staff writer) will continue its important work during 1934. This division of the campaign achieved a 1933 record by securing publication of nearly 150 feature articles on gas utilization in leading trade journals throughout the West!**

## DIRECT MAIL "TIE-INS"

**Through mailings to industrial gas users and "prospects," including distribution of advertisement-reprints, sales departments, cooperating with appliance manufacturers, will extend the scope of the campaign.**

## THREE MILLION IMPRESSIONS

**Nearly 300,000 readers of 20 leading Coastwide trade journals will see our full-page, two-thirds page and half-page ads each month during 1934. With twelve-months' advertising, this means over *3 million* "impressions." Actual installations and authentic testimonials will be featured. Following is the list of publications to be used:**

FIRST 1934 ADVERTISEMENT
features this striking figure.
Headline: "BTU" BECOMES A GIANT WHEN YOUR FUEL IS GAS.

***Architects:*** **Architect & Engineer . . . California Arts & Architecture.** ***Contractors, Builders:*** **Pacific Builder & Engineer . . . Daily Pacific Builder . . . Southwest Builder & Contractor.** ***Steel Companies, Machine Shops, Foundries,*** **etc.: Western Machinery & Steel.**

***Dairy Products Manufacturers:*** **Pacific Dairy Review.** ***Candy Manufacturers:*** **Western Confectioner & Ice Cream News.** ***Laundries, Dry Cleaners:*** **Pacific Laundry Journal and Dry Cleaner.** ***Bakers:*** **Western Baker . . . Pacific Baker.** ***Hotels, Restaurants, Caterers:*** **Keeler's Hotel Review . . . Western Hotel Reporter . . . Western Restaurant . . . Pacific Coast Record . . . Pacific Coast Chef . . . Hotel News of the West.** ***Retail Appliance Dealers:*** **Western Furniture Retailing.** ***Plumbing & Heating Contractors:*** **Western Plumbing & Heating Journal.**

## CONSUMER ADVERTISING

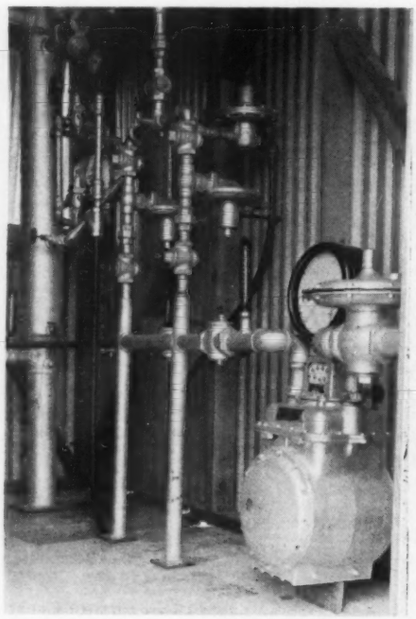
**The Committee hopes that conditions will soon warrant a resumption of our home consumer-advertising, formerly employing such general media as radio, magazines, outdoor posters, booklets, etc. Certain media can be used more effectively and economically on a cooperative basis. This is the premise on which our program has been so long and successfully maintained. Our 1934 advertising will again be prepared by Jas. C. Knollin, who has handled the campaign, under the Committee's direction, since its inception. Clifford Johnstone, as Managing Director of the Association, will correlate all activities.**

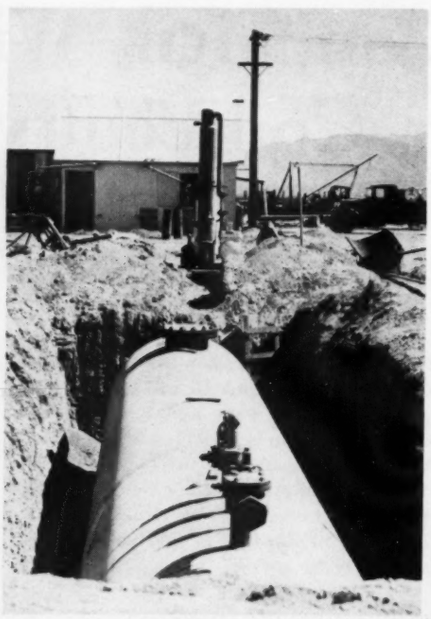
## WATCH FOR MORE DETAILS

**On this page each month, the Committee will report progress and publish reproductions of typical advertisements.**

# BUTANE • PROPANE NEWS

Vol. 4, No. 1 January, 1934

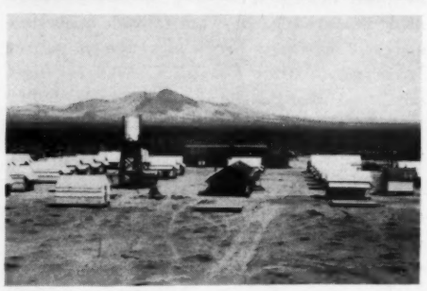





ILLUSTRATIONS

LEFT: Two views of butane plants at Southern California construction camps. Interior view is portion of American Liquid Gas Co. unit at Berdoo Camp, on the Colorado River aqueduct route. The construction view shows installation of standard Parkhill-Wade butane plant at Kingston Camp in Kingston valley, Calif., on Boulder Dam-to-Los Angeles power line.

BELOW: The upper view is a portion of Berdoo Camp, headquarters for Coachella section of aqueduct construction. Lower view shows portion of Kingston Camp on the power line project.



## Construction Camps Large Users of Butane From Central Plants

TWO mammoth projects have been in progress in Southern California for a number of months, providing an unique field of service for butane-propane. The Metropolitan Water District's 241-mile aqueduct, in the construction of which 13 Southern California cities are united, is the largest engineering undertaking on record. Some $220,000,000 is already appropriated for the job. Specifications call for digging of 29 tunnels totalling in all some 91 miles in length, and from 10,000 to 15,000 men are being employed.

Los Angeles Bureau of Power and Light has under way the second major project, its high tension power line from Boulder Dam to Los Angeles, approximately 270 miles in length. Eighteen months will complete this construction and $23,000,000 is its estimated cost.

Routes for both the aqueduct and the power line traverse desert and mountain regions many miles removed from population centers. Work is therefore handled on portions of both projects through construction camps, and here enters the service of butane.

Central plants for undiluted butane-propane vapor service have been installed at eight camps along the aqueduct route and at seven camps along the power line. Features of special interest in connection with plant design and utilization problems on both projects are discussed below.

*Aqueduct Camps*

American Liquid Gas Co. of Los Angeles installed the butane plants and supplies fuel for the aqueduct camps. At each camp a 4,000-gallon underground tank supplies liquid storage, filled from motor trailer or truck, either by gravity or pump. The tanks hold an entire trailer load (3,000 gallons) with ample reserve.

Of the undiluted vapor type, the plants consist of heat exchanger, liquid and gas regulators, a plant meter for recording gas into the distribution system, and recording volume and pressure gauges. Operation is entirely automatic.

Liquid passes through two regulators in parallel, either capable of carrying the full load, providing a safety factor against freeze-ups. From the regulators the liquid goes through a liquid level control which cuts off flow to the system if regulators or heat exchanger fail to function.

Next in the cycle is the heat exchanger which automatically vaporizes the liquid in the gas, heat being supplied by an automatic storage water heater of 40,000 B.t.u. per hour rating.

Specifications call for the plant to deliver 3,000,000 B.t.u. per hour, but the capacity is about twice that required. Heat content is kept constant at around 3,000 B.t.u. by varying the fuel mixture throughout the year. The average mixture is approximately 30 per cent propane and 70 per cent butane, the latter including about 15 per cent iso-butane.

Camp distribution systems use 2- and 3-inch main lines, all welded up to the service cocks located outside of each building. Belt systems are used at the larger camps and single feeder systems at the smaller ones. Some camps have as much as 3,000 feet of 2- and 3-inch lines with several hundred feet of service laterals. Distribution pressure is 12 inches.

Construction on the aqueduct will extend from five to six years and the camps are therefore of permanent construction, dormitories, commissary, mess hall, etc., are built of wood, and garages, gas plant house, shops, etc., of galvanized iron.

A typical aqueduct camp consists of the following:

Engineers' houses (four to six to a camp)—accommodating eight men each.

Labor dormitories (three to six to a camp)—accommodating 45 men each.

Commissary and recreation hall.

Cook house and mess hall.

Shops.

Compressor house.

Garage.

First aid house.

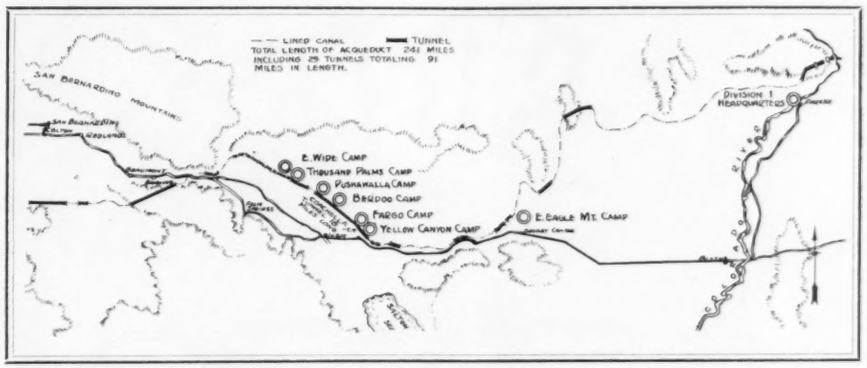
Warehouse.

Change house (lockers and showers).

At Berdoo Headquarters Camp there is also located a $65,000 hospital with complete facilities for rendering medical and surgical services to camp workers.

Gas service at the aqueduct camps includes part of the cooking load, almost all of the water heating and space heating loads, and numerous special uses mentioned below. Circulating heaters, many types of space heaters and several new types of air conditioners are included in the equipment served. Air conditioning units are mostly of the water spray type for cooling, with gas-fired warm air furnace units for winter heating.

Most of the appliances are served from the gas distribution system but an interesting departure is the use of direct liquid lines to heavy equipment such as forges and heat treating furnaces. For the liquid lines ¾-inch steel pipe was run directly from plant storage. Both gas and liquid lines at the plant outlet are equipped with regulating devices which cut off supply in the event of line breakage.




Route of Colorado River Aqueduct, showing location of construction camps served with butane by American Liquid Gas Co.

Much success has been had with butane for fueling locomotives used on the aqueduct project. Plymouth locomotives of 8-ton size are equipped for butane, four of these being now in service and numerous others to be added.

Thus far the butane locomotives operate only outside the tunnels, electric locomotives being used inside due to the fact that internal combustion engines on fuels formerly used developed carbon monoxide in dangerous quantities. Orsat tests have since been run on exhaust gases using butane in the locomotives, showing no indication of CO, while color tests have shown bare traces. Results of tests conducted by American Liquid Gas Co. show less than 1/10 of 1 per cent carbon monoxide, and it is considered possible that butane may be substituted for electric locomotives operating inside tunnels at some time in the future.

Gas locomotives have numerous advantages over the electric. They develop a 13-mile per hour speed (handling up to 12 five-yard cars—260 tons—on level grade) against 7 miles for the electrics.

The gas locomotives being used are converted gasoline engines. On butane faster and smoother acceleration is experienced, together with a 25 per cent increase in power. Fuel use on butane averages 14 gallons per 8-hour shift with a load of 12 cars. On gasoline the same load required about the same gallonage, but butane is delivered approximately one-fifth cheaper than gasoline.

Converting the locomotives to butane gas involves installing higher compression heads, advancing the spark, substituting a butane-air mixer to replace the gasoline carburetor, and replacing the fuel tank with tankage built to A.S.M.E. specifications. Fuel tanks are designed to fit the saddles for previous gasoline tanks. Twenty-gallon tanks are used and each locomotive is fueled once a day. An average daily run of 80 miles is estimated for each locomotive.

Fueling operations on the locomotives are of some interest. The tanks are filled in the cool part of the day by direct connection to the central plant storage tank. Difference in pressure due to the fact that temperature of the large tank is above that of the locomotive tank makes it possible to fill the latter without use of a pump, and this in spite of the fact that the central tank at one of the plants is 20 feet lower than the locomotive tank being filled.

*Power Line Camps*

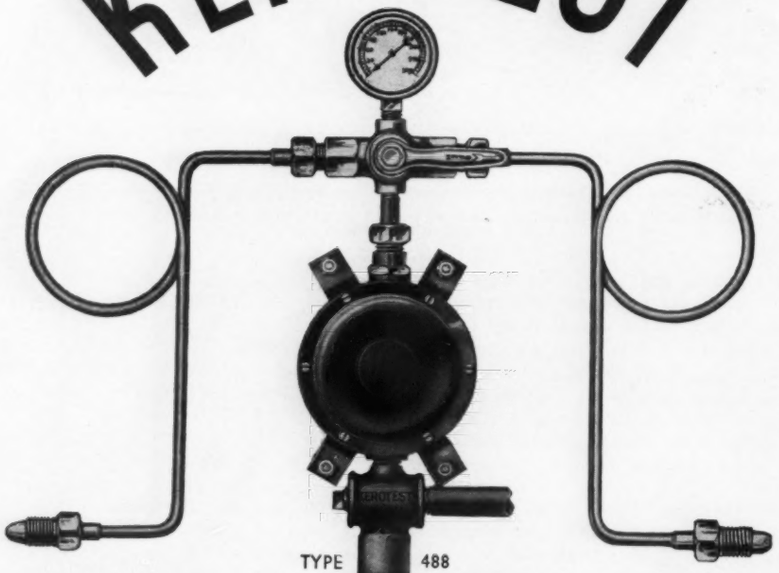
Parkhill-Wade, Inc., Los Angeles, designed the butane plants and has the fuel contract for camps on the Bureau of Power and Light's Boulder Dam-to-Los Angeles power line. One 100-man and six 150-man camps are being served with butane, the camps being located in the desert and mountainous stretch between Boulder City, Nevada, and Victorville, Calif. On the portion of the line from Etiwanda into the Los Angeles metropolitan area the workers live in towns.

Since construction work on the power line will be completed in about a year and a half these camps are of temporary construction. In a typical camp are found a cookhouse and dining room (wooden structure), a garage and a blacksmith shop (galvanized iron structures), 30 tents laid out in streets, each housing five men. These tents are of canvas top with wooden floors and sidings; they sit off the ground 18 inches to two feet. In addition the camps include a hospital tent, a commissary tent, bathhouse, and various galvanized iron structures to house the Kohler lighting units, air compressors, etc.

Gas plants at the seven power line camps each have 4,000-gallon underground storage and vaporizers of 1,000-cubic foot per hour capacity. The plants are the standard Parkhill-Wade generating units for undiluted vapor service, a feature of this design being that all pressure reduction is handled in the vapor stage. Deliveries are made to the gas plants in a 5,000-gallon tank drawn on a semi-trailer. The longest haul is 350 miles, and the tank truck is operating very successfully on butane fuel. *(Turn to Page 26)*

Butane-powered locomotives, 8-ton size, are used in Colorado River Aqueduct construction work.

KEROTEST




PROPANE MANIFOLDS

DIAPHRAGM PACKLESS

Forged brass construction of valve body and bonnets assure 100% safety and control at any pressure . . . specially formed triple metal diaphragm insures proper flexing in all positions . . . convenient location of lever handle gives fingertip control of Bottled Propane Gas . . . a most efficient unit designed especially for propane service.

Write for Circular W describing this and other Kerotest Forged Brass Products for Propane Gas Service.

KEROTEST MFG. CO.
PITTSBURGH, PENNA.

KEROTEST

A varied load is served at each of the camps. In each tent is a 30,000 B.t.u. hourly input console heater. Water heating needs for the bath house are supplied by a 200-gallon capacity storage automatic water heater with additional recovery tank of 100-gallon capacity per hour. In the camp kitchens are two of the same type water heaters with 400-gallon hourly capacity recovery tank.

In the kitchens an interesting load is carried on the French ranges which have been adapted from oil to butane. Special burners were substituted and a baffle placed in the firebox to effect proper distribution of heat. These French ranges can be brought from room temperature to 450-degree oven temperature in 45 minutes on butane, whereas it required from 2½ to 3 hours on oil. Two regular heavy-duty restaurant gas ranges are also served in the kitchens of each camp, in addition to a gas bakeoven in each kitchen.

On winter consumption the 150-man camps are using 4500 gallons of butane-propane mixture per month. Gas is competing very favorably with oil, effecting savings sufficient to write off the plant investment in 18 months. Less gas is being used than oil and the safety, cleanliness and convenience factors of course are much improved.

## Mobile Gas Service Corp. Adds Two Members to Board

At a recent meeting of the board of directors of the Mobile (Ala.) Gas Service Corp., Thomas J. Taylor of Taylor-Lowenstein Co. and E. A. Hill of the Mobile Glass Co. were elected to the directorate.

## Island Home Commodities Sold to Jacob Selikowitz

The Richard F. Ely interests have sold Island Home Commodities, Inc., at South Huntington, Long Island, to Jacob Selikowitz who owns and operates the Conservative Gas Co. in Brooklyn.

The purchasers have operated in Brooklyn for eight years serving (7-70) gas which is fed from cylinders as a liquid and then vaporized in a copper tubing coil and passed through a vapor regulator before going to the appliance.

Island Home Commodities has distributed the conventional 2-drum Philgas sets. Under the plans of Mr. Selikowitz each company will be maintained separately.

## Sales Engineer for Philgas at New York Office

Howard W. Gustafston has been appointed as sales engineer assisting H. Emerson Thomas, eastern representative of Philgas Co., located at New York.

Mr. Gustafston's field will lie primarily in industrial sales work. He will also handle part of the wholesale bottled gas and gas manufacturing enrichment for the Eastern Seaboard.

Prior to accepting the post with Philgas Mr. Gustafston was sales manager of General Air Conditioning Corp. of Madison, Wis.

## Rocky Mountain Gas Co. "Sour" Gas Purified By Soda

A plant which will employ soda from alkali earth in the purification of "sour" natural gas is to be erected at Green River, Wyo., by the Rocky Mountain Gas Co., Casper, Wyo. The new process was developed by the company in a series of experiments at Salt Lake City, Utah. As a source of supply the gas company recently purchased mineral rights to a plot of land at Green River on which its offices and warehouses are located, and the new process will purify gas for distribution in Green River.

## Exhibit Feature to be Restored At 16th A. G. A. Convention

Definite announcement has been made by the American Gas Association, that exhibits will be part of its 16th annual convention to be held at Atlantic City next October. Exhibits have been omitted for the past two years, but due to general demand this valuable feature of the national convention is being reinstated.

## Salt City Gas Co. to Lay Line to Hutchinson Institution

Salt City Gas Co., Hutchinson, Kan., recently formed by Milo Jones and associates of Chanute, Kan., is reported laying a 10-mile, 6-inch pipe line from the Reno county gas field to Hutchinson. The line will primarily serve the power plant of the state reformatory. Cities Service Gas Co. supplies gas to the city of Hutchinson.

## Compressed Gas For Dining Cars from Belfast Plant

Corporation Gas Works, Belfast, Ire., has under installation a plant for compressing coal gas to supply fuel for dining cars of the Great Northern Railway Co. It is estimated that the railway's annual consumption will be about 2,000,000 cubic feet at the outset.

The plant consists of a six stage compressor, the gas being compressed to 5,000 pounds per square inch. It is stored at this pressure in steel cylinders from which small service cylinders are filled to 3,000 pounds per square inch pressure. The service cylinders are especially developed for motor traction purposes, having a water capacity of 1.76 cubic feet, and contain approximately 350 cubic feet of gas at 3,000 pounds pressure. The cylinders are 6 feet 2 inches long, 7.5 inches inside diameter, with a minimum thickness of .205 inches, and weigh approximately 100 pounds.

James D. Smith is engineer and manager of Corporation Gas Works.

## Definite Dates for 1934 Meeting Natural Gasoline Association

Dates for the 13th Annual Convention of the Natural Gasoline Association of America have been definitely fixed for May 9-11, 1934, according to announcement from Ray E. Miller, secretary of the Association.

The meeting will be held in Tulsa, Okla., with headquarters at the New Hotel Tulsa.

Tentative dates announced previously for the week following the above dates were changed on account of the decision of the International Petroleum Exposition to hold the oil show in Tulsa, May 12-19, inclusive. As now scheduled the natural gasoline group's meeting will cover the three days immediately preceding the oil show and thus enable those who wish to attend both meetings to do so without loss of time.

## Bottled Gas Business Opened at Middletown, N. Y.

J. Kendel and Fred Kendel who recently sold their interest in County Gas Utilities (Liberty Natural Gas Co.) to George Langer of Woodridge, New York, are now opening a business at Middletown, New York, for the distribution of bottled gas.

Mr. Langer also owns the Langer Gas Service Inc. of Woodridge, New York, operating the two companies independently.

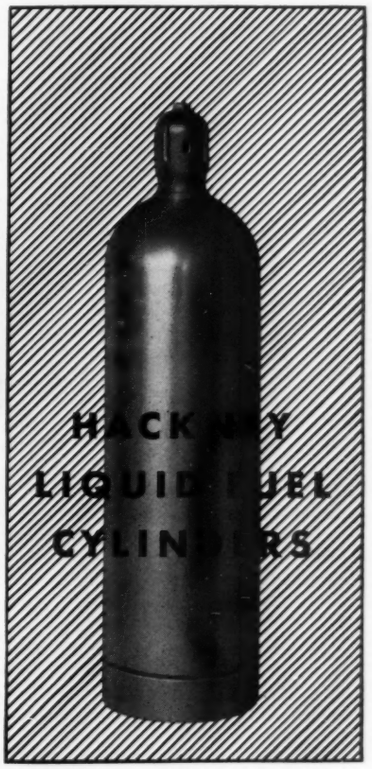
## Mayfield Gas Co. Granted Time Extension On Service

The Board of Council for the city of Mayfield, Ky., has given the Mayfield Gas Co., Inc., present holders of a franchise for a butane plant in the city, until June 6, 1934, to begin service to consumers. Butane gas will be served at $1.45 per M c.f.

## Superior to Make Butane-Propane

Superior Oil Co., Los Angeles, Calif., has equipped its Kettleman Hills gasoline plant for manufacture of liquefied petroleum gas and will be on production by February 1.

There are TWICE as many Hackney Liquefied Petroleum Gas Cylinders in Service as all others COMBINED.

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## Oregon and Wash. Properties Sold By Pacific Public Service

Announcement of sale of Natural Gas Corp. of Oregon and Natural Gas Corp. of Washington, liquefied gas plant operators owned by Pacific Public Service Co. was made early in January by R. W. Hanna, president of Pacific Public Service. The purchasing group is headed by Bernard W. Ford, vice-president of Blyth & Co., investment house, and also vice-president of Pacific Lighting Corp.

With the sale Pacific Public Service Co. retires from public utility operation in Oregon and Washington. Plants operated by Natural Gas Corp. of Oregon are located at Bend, Coquille, Cottage Grove, The Dalles, Klamath Falls and La Grande. Plants operated by Natural Gas Corp. of Washington are located at Anacortes, Camas, Port Angeles, Port Townsend and Shelton.

## Bottled Gas and Compressed Gas Groups to Meet

Dates for the annual meeting of the National Bottled Gas Association are January 24; the meeting will be at the Waldorf-Astoria, New York, N. Y. On January 25 and 26 the Compressed Gas Manufacturers' Association, Inc., will hold its annual meetings, sessions also being at the Waldorf-Astoria.

# Eighth Mid-West Sales Conference Due in February

AT A RECENT meeting of the Mid-West Regional Gas Sales Council in Chicago, Ill., it was decided to hold the 8th annual Mid-West Regional Gas Sales Conference at Hotel Sherman, Chicago, February 15 and 16. The Conference is an annual activity of the A. G. A. Commercial Section, of which J. W. West, Jr. is secretary.

Subjects included in the tentative program follow:

Rental-Sales Plans (with special reference to New England Experience on Water Heating).

Electric Cooking Competition from the Gas Company's Viewpoint.

Electric Cooking Competition from the Manufacturer's Viewpoint.

Cooperative Gas Range Campaigns.

Kitchen Planning for Greater Sales.

Developing the Below-Average Customer.

Water Heating Sales through Upstairs Controls.

Gas Refrigeration Today.

Forced Air Heating with Gas.

Space Heating—A Neglected Load Builder.

Selling Heating in the Chicago Area.

The Mid-West Regional Gas Sales Council which has arrangements for the February Conference in hand, comprises the following members:

E. J. Boyer, chairman, Minneapolis Gas Light Co., Minneapolis, Minn.

W. L. Jones, vice-chairman, St. Louis County Gas Co., Webster Groves, Mo.

J. T. Busch, Illinois Power & Light Corp., Chicago, Ill.

Henry K. Dropp, Milwaukee Gas Light Co., Milwaukee, Wis.

W. R. Evans, The Peoples Gas Light & Coke Co., Chicago, Ill.

E. R. Felber, Madison Gas & Electric Co., Madison, Wis.

E. H. Frazier, Jr., Battle Creek Gas Co., Battle Creek, Mich.

Stanley Jenks, Northern Indiana Public Service Co., Hammond, Ind.

C. A. Luther, The Peoples Gas Light & Coke Co., Chicago, Ill.

F. X. Mettenet, Public Service Co. of Indiana, Indianapolis, Ind.

W. F. Miller, Public Service Co. of Northern Illinois, Chicago, Ill.

C. A. Nash, United Light and Power Engineering & Construction Co., Davenport, Ia.

F. M. Rosenkrans, Gas Service Co., Kansas City, Mo.

A. E. Schwarz, Minnesota-Northern Power Co., Minneapolis, Minn.

J. T. Schilling, Des Moines Gas Co., Des Moines, Ia.


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## Early Wind-up of Arizona Project In Sight

Western Gas Co.'s 217-mile line will reach its terminus at Phoenix, Ariz., early in January, according to D. H. Tucker, Arizona manager of the company

Arrival of natural gas at Tucson was heralded on December 11, with a 40-foot torch burning at the company's gate valve. Under the direction of C. H. Weber, superintendent of the Tucson Gas, Electric Light and Power Co. gas department, change-over operations have proceeded in Tucson during the past month. First delivery of natural gas to customers was made on December 13 in the Menlo Park area. A corps of 40 adjusters has been at work and the last of the five districts into which the city has been divided was due for completion by January 1.

## More Illinois Communities Getting Natural Gas

On December 1 natural gas was turned into Hoopeston, Ill., by the Panhandle Illinois Pipe Line Co. through a line constructed by the Central Pipe Line Co. for distribution by the Central Illinois Public Service Co.

Early in January the Panhandle Illinois Pipe Line Co. expects to turn natural gas into Canton, Ill., to the Central Illinois Public Service Co. for distribution in Canton, Havana, Macomb, and Lewistown, Ill. Central Illinois Public Service Co. will sell gas to the Central Illinois Light Co. for distribution in Cuba, Ill.

Both lines were completed in December, but the change-over on the Canton group from manufactured to natural gas was held over so as not to interfere with the holidays.

## Republic Steel Corp. Publishes New Trade Literature

Two new pieces of trade literature have just been brought from the press by the Republic Steel Corp., Youngstown, Ohio. The latest edition of "Toncan Iron Pipe for Permanence" contains 64 pages of information on Toncan iron pipe, corrosion-resisting product of Republic Steel. The catalog is in two parts; Part 1 is given over to technical data and tests under various conditions; Part 2 includes a wide collection of installations and service records in a variety of applications. A complete description of Toncan iron, its composition, advantages, rust-resistance, physical properties, working qualities and records or service, is included.

"The Technical Story of Toncan Iron Pipe" is the title of a second catalog now ready for distribution by the company. The 24-page booklet contains technical data on the manufacture, applications and performance of Toncan iron pipe, and is designed to appeal to the engineer and practical operating man. Included is also a discussion of Republic's patented electric resistance welding process.

## Natural Gas In Prospect for Several Washington Towns

Hiram O. Griffin, representing himself and others interested in natural gas developments in Whatcom County, about six miles west of Bellingham, Wash., has applied for a franchise to lay gas mains over various county roads between the wells and Bellingham vicinity and also from the wells to Ferndale, about eight miles west of Bellingham. If sufficient gas is developed the market for it might include Blaine, Birch Bay, Lynden, Sumas, Lawrence, Deming, Nooksack, and Everson, in addition to Bellingham and Ferndale. Two wells which were brought in around December 1 have production of around one million cubic feet daily while a third well brought in late in December has production of approximately four million feet daily.

Formation of a company to engage in pipe line operations was expected shortly, among those interested being C. S. Shippey who is in charge of drilling developments.

## John F. Weedon Retires From Peoples Gas Advertising Dept.

After 44 years of service with Peoples Gas Light and Coke Co., Chicago, John F. Weedon retired in December. For the last 19 years he had been in the company's advertising department, of which he was superintendent. Mr. Weedon launched the "Peoples Gas Club News" and also originated the "Peoples Gas Gazette," consumer medium of the company.

Clayton G. Cassidy has been named successor to Mr. Weedon as head of the Peoples Gas advertising department. Mr. Cassidy for the past four years has served as director of advertising and publicity for Midland United Co. of Indiana.

## Fairweather to Calexico, Calif.; Williams to Arcata

Natural Gas Corp. of Calif. announces the transfer of F. R. Fairweather, formerly local representative at Arcata, to the Calexico office where he succeeds Jack Slaven as local representative. L. R. Williams comes from the Natural Gas Corp. of Ore.'s Coquille office to take over Mr. Fairweather's duties in Arcata.

# Natural Gas Industry Code Submitted to N. R. A.

ON December 19 a proposed basic code of fair competition for the natural gas industry was placed in the hands of the National Recovery Administration at Washington by the American Gas Association, representing 67.2 per cent of the industry. Hearings on the proposed code were scheduled to take place on January 3. While the proposed code is of course subject to change it is of considerable interest to the industry in its present form and is reproduced in full below.

## CODE FOR THE NATURAL GAS INDUSTRY

### ARTICLE I—PURPOSES

The Natural Gas Industry has been and is cooperating with the National Recovery Administration in carrying out the objects of the National Industrial Recovery Act and the purposes of this Code are to increase employment, maintain fair and adequate wages and standards of labor, and otherwise effectuate the policy of TITLE I of the Act.

In the conduct of its business this Industry is fundamentally different than industry generally in that it is under obligation to render a continuous and uninterrupted public service and its standards of service and the rates charged the consuming public are, to a large extent, regulated by Public Authorities having such powers.

### ARTICLE II—DEFINITIONS

The term "Natural Gas Industry" as used herein includes the production, transmission and/or distribution of natural gas, including the construction, operation, and maintenance of facilities therefor by members of the Industry, and other activities incidental thereto.

The term "Natural Gas" as used herein may include mixed gas as well as straight natural gas. Any member of the Industry serving a mixture of natural and manufactured gas shall have the right to adopt this Code, before its effective date, and an election, so made, shall not be changed.

The term "Member of the Industry" or "employer" as used herein, includes without limitation every individual, partnership, association, corporation or other organization, engaged in the production, transmission and/or distribution of natural gas as herein defined.

The term "professional person" as used herein includes lawyers, chemists, senior accountants, research technicians, technical engineers, geologists, scouts, leasemen and other persons engaged in occupations requiring a special discipline and special attainments.

The term *"employee"* as used herein includes any and all persons engaged in the Industry, however compensated, except a member of the Industry.

The term *"Act"* and *"Administrator"* as used herein mean respectively Title I of the National Industrial Recovery Act, and the Administrator for Industrial Recovery.

"Southern territory" as used herein includes the states of Virginia, West Virginia, Maryland, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, New Mexico, Arizona and Texas.

The term "population" as used herein refers to the population as shown in the 1930 Federal Census.

### ARTICLE III—HOURS OF EMPLOYMENT

**Maximum Hours**

Section 1. No employee, other than clerical and other office employees, and except those otherwise specified in this ARTICLE III, shall be permitted to work more than an average of 40 hours per week during any four week period. Clerical and other office employees shall be permitted to work not more than an average of 40 hours per week during any eight week period.

**Hours for Shift Employees**

Section 2. Those employees engaged in activities which must be continuously performed in order to render to the public safe and continuous service may work an average of 48 hours per week. Although such employees may work more than 48 hours per week during emergencies and during periods of seasonal or peak demands, the average number of hours per week for any twenty-six week period (beginning January 1st and July 1st of each year) shall not exceed 48.

Employees coming under the following classifications as to duties, including their attendants, crews and helpers are included in Section 2 above—

(A) Station Operators
1. Compressor Station
2. Regulator Station
3. Measuring Station
4. Conditioning Station

(B) Load Dispatchers and Pressure Regulators.

(C) Employees engaged in Emergency Repair Work.

**Exceptions As To Hours**

Section 3. The maximum hours fixed in the foregoing Sections 1 and 2 shall not apply:

(A) Where the services of not more than two persons are employed in any one shift in any community of less than 2500 population, which community is not a part of a larger immediate trade area of a city of larger population;

(B) To employees in any community less than 500 gas meters, which community is not part of a larger immediate trade area of a city of larger population.

(C) To sales employees on a commission basis.

(D) To individual employees living in isolated places and/or whose duties are intermittent in nature and are performed at or in close proximity to their places of residence.

(E) To employees in managerial, executive or supervisory capacities and their immediate staffs, and also to professional persons, receiving $35.00 or more per week ($30.00 or more per week in Southern Territory).

**Employment by Several Employers**

Section 4. No employer shall knowingly engage any employee for any time which when totaled with the time of work that he had already performed with another employer, or employers, exceeds the maximum permitted herein.

### ARTICLE IV—WAGES

**Minimum Wages**

Section 1. All employees, both male and female, except those covered by the provisions of Section 2, 3 and 4 of this ARTICLE IV and also except employees in Southern Territory, where the weekly minimum wages shall be $1.00 less than that specified below, shall be paid at the rate of:

(A) Not less than $15 a week in any city of over 500,000 population or in the immediate trade area of such city;

(B) Not less than $14.50 a week in any city between 250,000 and 500,000 population or in the immediate trade area of such city;

(C) Not less than $14 a week in any city between 2,500 and 250,000 population or in the immediate trade area of such city, and

(D) Not less than $12 a week in any town of less than 2,500 population.

**Minimum Hourly Rates**

Section 2. Employees of the classes who on July 1, 1933, were paid on an hourly rate shall be paid not less than 40c per hour unless the hourly rate for the same class of work on July 15, 1929, was less than 40c in which latter case the hourly rate of pay shall be not less than 30c. In the Southern Territory employees of the classes who on July 1, 1933, were paid on an hourly rate shall be paid not less than 35c per hour unless the hourly rate for the same class of work paid by employers in said territory on July 15, 1929, was less than 35c, in which latter case the hourly rate of pay shall be not less than that of July 15, 1929, and in any event shall be not less than 25c per hour.

**Minimum Part Time Rates**

Section 3. Part time employees shall be paid not less than at rates proportionate to the rates prescribed in the foregoing sections of this ARTICLE IV.

**Exceptions to Rates**

Section 4. All employees included in ARTICLE III, Section 3, Sub-section C, and those employees in Sub-section D whose duties are intermittent, are excepted from the wage provisions hereof.

**Handicapped Persons**

Section 5. A person whose earning capacity is limited because of age or physical or mental handicap may be employed on light work at a wage below the minimum established by this Code if the employer obtains from the State authority designated by the United States Department of Labor a certificate authorizing the employment at such wages and for such hours as shall be stated in the certificate. Each employer shall file with the Code Authority a list of all such persons employed by him.

### ARTICLE V—GENERAL LABOR PROVISIONS

**Child Labor**

Section 1. No person under sixteen years of age shall be employed in the industry.

**Provisions From the Act**

Section 2. In compliance with Section 7 (a) of the Act it is provided:

*(Continued on Page 41)*

# MEASUREMENT and CONTROL

# Natural Gas Utilization in a Large Central Station

*By* F. G. PHILO

*Superintendent of Fuel-Electric Stations, Southern California Edison Co., Ltd.*

FOR its November 23 program the Southern California Meter Association was fortunate in securing the accompanying paper by F. G. Philo, dealing with utilization aspects of natural gas service in the Long Beach Steam Station. Daily gas requirements at this station may be as high as 130 million cu. ft.—the "world's greatest" installed capacity for natural gas use by a single industrial plant.

*F. G. Philo*

Mr. Philo is superintendent of fuel-electric stations, Southern California Edison Co., Ltd. Mem. A.S.M.E. He was educated at Ohio State University and in 1911 participated in the Delray tests of large boilers of the Detroit Edison Co. From 1912 to 1914 he was boilerroom engineer for the Corn Products Refining Co., Edgewater, N. J., and later was efficiency engineer for the Harwood and Hauto power stations of the Lehigh Navigation Electric Co. During 1918-1919 he placed in operation the Burling Slip Station "A" of the New York Steam Corp., and was appointed chief operating engineer of its downtown New York district. From 1919 to 1924, Mr. Philo was connected with Stone & Webster, Inc., as engineer in the power-station betterment division. Most of his time was spent in power-station betterment and initial operation of new power stations. In 1924, after placing the Long Beach steam plant of the Southern California Edison Co. Ltd., in operation for Stone & Webster, Inc., he was appointed to his present position.—*Editor.*

THE generation and distribution of electric light and power through the large inter-connected systems of today is a peculiarly exacting business. The generating company must assume responsibility for meeting satisfactorily the requirements of each individual consumer with which it deals, and the general standard of service maintained must necessarily be of a quality satisfactory to the most exacting user connected to its lines.

The distributing system of the Southern California Edison Co., Ltd. comprising all or a part of each of the 10 southern counties of California is distinguished in the national field of electric service for a wide diversity of year-around activities into which the service of electric energy enters as one of the most important factors. Agriculture, the petroleum industry, the motion picture industry, automobile and rubber tire factories, foundries, machine shops, glass production, publishing, meat packing, and wearing apparel are all operating in this territory. Demands for future development will call for blast furnaces, textile mills and electrochemical factories. Practically all of these industries use electric energy extensively and new applications are being developed rapidly.

The diversity of topography, climate and natural resources of this district, reinforced by an abundance of raw materials for manufacture and the immediate availability of a plentiful supply of cheap fuel and electric power, has placed Southern California industrially preeminent in the West.

The extensive reach of this electric service, together with the adequacy of Southern California transportation facilities has encouraged the spread of home life from the more congested sections to suburban territory, with many attendant benefits.

Each industry has its particular power and lighting problem which must be safeguarded by the electric generating company. Certain industries, such as motion pictures and textiles, require the utmost in exact speed regulation, and this has been solved so thoroughly by the central stations of today that the 125,000 h.p. generators at the Long Beach Steam Station are driving and regulating the clocks of Southern California and providing an exactness of timing heretofore unheard of outside of scientific laboratories.

Other industries require constant voltage or pressure and this also is cared for by automatic regulation.

Above everything else the almost universal demand of all consumers is for continuity of service. Power must be kept on the lines at all times, if humanly possible. Through fire, flood, storm and personal injury, power and light, like the play "must go on." If a Saint Francis dam breaks, if floods come, even during earthquakes, the current must and does go out over the lines.

The West, where more or less abundant supplies of water power are available, has in the past been extensively developed for electric generating purposes; but even here, in order to more thoroughly protect the service, it has long been the practice to reinforce the distant hydro-electric stations by fuel-electric stations located near the center of distribution. Recent improvements in the utilization of steam power have demonstrated that under present conditions it is also more economical to develop steam power than the remaining more expensive hydro-electric possibilities and during recent years there has been a decided trend to the more extensive use of power derived from fuel. This development has continued to such an extent that at the beginning of this year (1933) the Edison Co. had a steam capacity of 618,765 h.p., or approximately 50 per cent of its total generating capacity of 1,273,372 h.p.

Increased capacity in steam power means increased dependence upon its basic source—fuel. An interruption in fuel supply would immediately interrupt that continuity of service so vital to our industry.

With coal and fuel oil it is the usual practice to store considerable quantities near major generation plants, readily available for emergency use, and, by so doing, it has always been assumed that the fuel supply would be adequately protected.

In considering gas distribution methods, it immediately becomes apparent that it is impractical to store on the premises gas in sufficient quantities to meet the requirements of a modern steam plant, such as the Long Beach Steam Station, where the daily requirements may be as high as 130 million cubic feet. This objection to gas fuel is partly taken care of in Pacific Coast stations by providing equipment for the combined use of fuel oil and natural gas with adequate storage of fuel oil for emergency use. Any failure of lines or equipment that would suddenly interrupt the gas suppy would still be serious, for it requires an appreciable time to make the change from gas to oil on a large number of burners. At Long Beach a complete change in fuels would require perhaps 30 minutes, which in our business would be considered a major calamity. It is a tribute to the service of the gas distributing systems of this territory that in some 11 years' use of this fuel, as far as I know, there has never been a sudden failure of this kind at this station, although, during periods of limited supply or pipe line trouble, it has sometimes been necessary to make frequent changes between the two fuels.

Serious consideration of the use of gas fuel in the Los Angeles area followed closely the extensive oil development on Signal Hill in 1921 and 1922. During this period very large amounts of natural gas were blown to atmosphere because there were no domestic demands for this product in anything like the quantities in which it was being produced. It was during this time that the Southern California Edison Co., Ltd., a large fuel consumer at its Terminal Island plant near this field, was approached with the suggestion of substituting natural gas for fuel oil.

I imagine it was with some reluctance that the effort was made to use this new fuel. Some gas had previously been burned under power boilers and there were rumors of disastrous explosions. Furthermore, there was little or no successful combination equipment on the market for the burning of gas and oil, the general result being that oil burners would be destroyed while burning gas and the gas equipment would be seriously damaged while burning oil. Notwithstanding the obstacles to its use gas fuel was installed under two 850 h.p. boilers at Long Beach on April 21, 1922. The burners used were the Bunsen type, home-made, and each furnace contained some 250 separate burners and would consume about 45,000 cu. ft. of gas per hour. This burner was an adaptation of one already in use at the Button Willow Plant of the San Joaquin Power Co. and, with some modification, was installed in some 60 furnaces in our system. Various commercial makes of burners were also tried during this development period, but many unexpected difficulties were encountered in their adaptation to large power boilers. The gas used was "wet" gas, which carried the usual liberal additions of water, sand and oil in such quantities as often to flood the ash pits and fill even the best burner equipment with deposits of sand and oil.

These early attempts to use gas fuel were a rather trying experience, but, with increased familiarity and extended use, many of the troubles were overcome and certain benefits, such as cleaner heating surfaces and less maintenance of furnace refractories, were found directly due to its use.

Since this initial installation of gas fuel early in 1922 the Edison Co. has applied gas to 112 boilers, totaling 98,122 boiler horsepower, and has burned slightly more than 88 billion cubic feet of gas (88,008,235,150), equivalent to more than 3½ milion tons of coal.

As use of gas fuel increased and field supplies were depleted sources other than Signal Hill were used. These included Ventura, and later Kettleman Hills.

The present supply of gas to the Long Beach Steam Station comes largely from Kettleman Hills through a 26-inch steel pipe line of the Southern Fuel Co. constructed in 1931.* Originating at Kettleman Hills, 208 miles north of Long Beach, this line passes through Kettleman plains, Antelope plain, past the Lost Hills, and Belridge Oil fields to and across the west end of the Elk Hills, thence to the east of the Midway Sunset oil field to the lower end of the San Joaquin Valley and over the Tehachapi Mountains from Grapevine to Castaic in a route approximately following the Ridge Route Highway; thence to Newhall, Glendale and through the Boyle Heights district of Los Angeles to Lynwood and Compton, finally reaching the Long Beach Steam Station by way of a submarine crossing under Cerritos Channel. The short length between Anaheim Road and the Station is paralleled by an older 16-inch line belonging to the Edison Co., which affords additional protection for the troubles in submarine crossing.

The arrangement on the property is shown in Fig. 1.

The pressure of the gas to the regulators at the station ranges from a low of 50 lbs.

* See WESTERN GAS, Dec., 1932, for map of Southern Fuel Co. line.

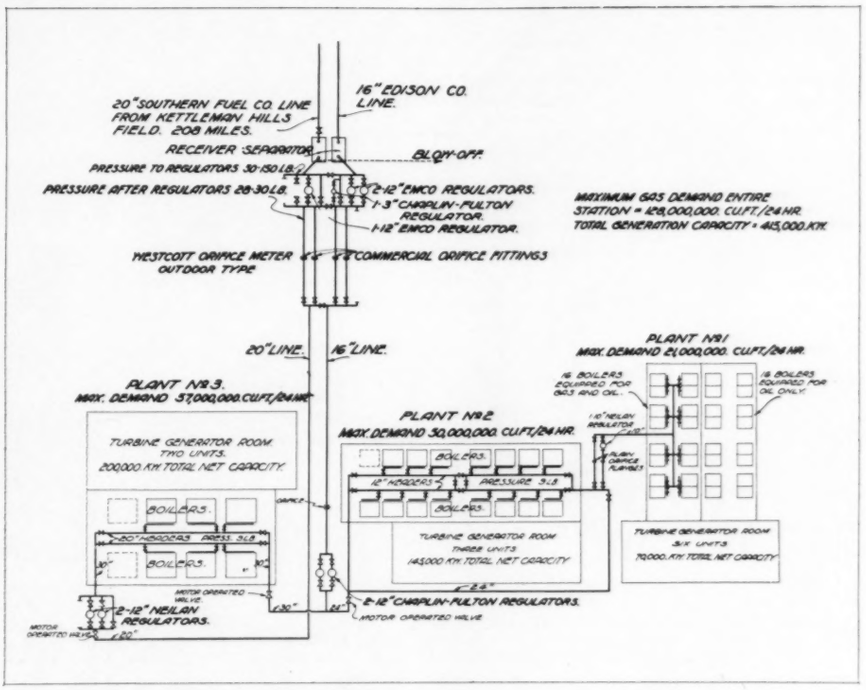

20"SOUTHERN FUEL CO. LINE FROM KETTLEMAN HILLS FIELD. 208 MILES.
16" EDISON CO. LINE.
RECEIVER SEPARATOR
BLOW-OFF
PRESSURE TO REGULATORS 50-150 LB.
PRESSURE AFTER REGULATORS 28-30 LB.
2-12" EMCO REGULATORS.
1-3" CHAPLIN-FULTON REGULATOR.
1-12" EMCO REGULATOR.
MAXIMUM GAS DEMAND ENTIRE STATION = 420,000,000 CU.FT./24 HR.
TOTAL GENERATION CAPACITY = 415,000 KW.
WESTCOTT ORIFICE METER OUTDOOR TYPE
COMMERCIAL ORIFICE FITTINGS
20" LINE.
16" LINE.
PLANT NO 1
MAX. DEMAND 21,000,000 CU.FT./24 HR.
16 BOILERS EQUIPPED FOR GAS AND OIL.
16 BOILERS EQUIPPED FOR OIL ONLY.
PLANT NO 3.
MAX. DEMAND 57,000,000 CU.FT./24 HR.
TURBINE GENERATOR ROOM TWO UNITS. 200000 KW TOTAL NET CAPACITY.
BOILERS.
PLANT NO 2
MAX. DEMAND 30,000,000 CU.FT./24 HR.
12" HEADERS
PRESSURE 5 LB
TURBINE GENERATOR ROOM THREE UNITS. 145000 KW TOTAL NET CAPACITY
TURBINE GENERATOR ROOM SIX UNITS. 70000 KW TOTAL NET CAPACITY
2-12" NEILAN REGULATORS.
2-12" CHAPLIN-FULTON REGULATORS.
MOTOR OPERATED VALVE

FIG. 1. Layout of main lines and gas distribution system at Long Beach steam station of Southern California Edison Co., Ltd.

to a normal maximum of 150 lbs. It is reduced by three 12-inch Emco pilot controlled regulators to a range between 28 and 30 lbs. It is further reduced to a range from 7½ to 9 lbs. before entering the building by regulators as follows: to Plant No. 3 by two 12-inch Neilan regulators pilot operated by pressure in the burner headers and to Plant No. 2 by two 12-inch Chaplin-Fulton weight controlled regulators. The latter regulators have auxiliary pilots to further sensitize the weights control.

Gas flowing to the individual boilers is controlled in Plant No. 3 by chronometer valves actuated by the Bailey automatic combustion control and in Plant No. 2 by globe valves manually operated.

Measurement is made by Westcott orifice meters which record the differentials across orifices located in Commercial Iron Works orifice fittings set in three 16-inch and one 12-inch tubes and operating in the 28-30 lbs. pressure range. The meters are checked daily for zero setting and are given water column calibrations periodically or at the request of the Southern Fuel Co. or the Edison Co. Meter charts are changed at midnight. A man on the 11:00 p.m. to 7:00 a.m. shift averages the pressures and temperatures on either 15-minute or one-hour periods, depending on the frequency of fluctuations in flow, and computes the quantities. These computations are checked by the station statistician early in the morning and the charts mailed to the Southern Fuel Co. for further check. Computed volume for the 24-hour period is telephoned to the Southern Fuel Co. early each day. Temperature of the flowing gas at the meters is recorded by a Taylor recording thermometer. The bare thermometer bulb is located in the 20-inch line after the meters to insure a representative value for all gas flowing.

Spare orifice plates of different diameters are available and orifices are changed to keep the differentials within the desired range. Sufficient orifice capacity for possible sudden load pick-up is always kept in service. Orifices are inspected and cleaned frequently, depending upon conditions. Daily heat balance of fuel and station output has been found a dependable indication of inaccuracy in metering.

The heating value of the gas is continuously determined by a Thomas recording calorimeter. This instrument records the rise in temperature produced in a constant flowing volume of air by the combustion of a constant volume of gas. The record is calibrated in B.t.u. per cubic foot of gas. This calorimeter is checked twice each month by means of pure hydrogen. The accuracy is found to be between 0.2 and 0.5 per cent. The range of the Thomas calorimeter is from zero to 1500 B.t.u. per cu. ft. Specific gravity of the gas is measured by a Ranarex specific gravity recorder with a range from 0.35 to 1.00. This instrument measures the relative power required to rotate fan blades in atmospheres of air and a flowing sample of gas, and is calibrated in specific gravity with air as unity. The Ranarex is checked daily or more often by an Edwards gas balance.

During the early months of service of the Kettleman Hills line considerable trouble was experienced from erosion by an abrasive dust carried by the gas. Erosion was particuarly troublesome in regulators and the chronometer control valves at the boilers. This erosion has greatly diminished but not entirely disappeared.

A water shortage in 1924 turned the attention of western central stations to a more extended use of steam power, and in the design of a new station it was desired to provide for the combined use of natural gas and fuel oil, under boilers of much larger size where forced and induced draft would be used together with mechanical atomizing of fuel oil. The final result at Long Beach is the station

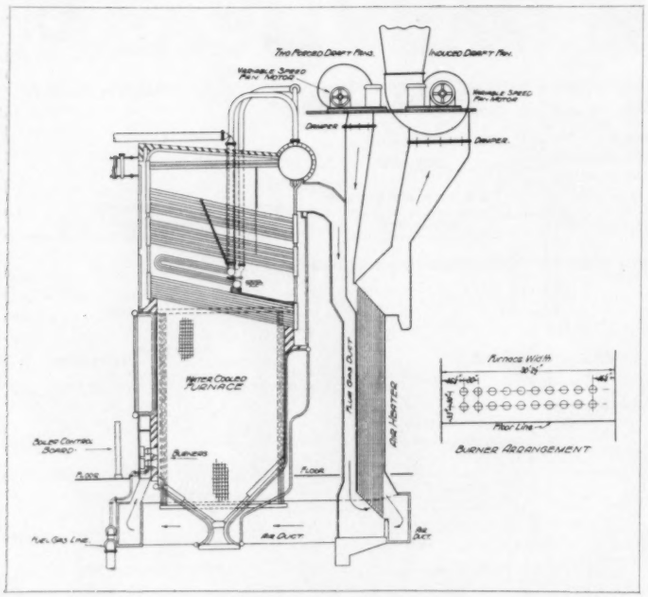



FIG. 3.

FIG. 3 is a cross-section of a 3416-h.p. boiler at Long Beach steam plant No. 3. Heating surfaces are as follows: Boiler 34,162 sq. ft. (35.9 per cent of total); Superheater 6,553 sq. ft. (6.9 per cent of total); Water cooled furnace walls 3,240 sq. ft. (3.4 per cent of total); Air heater 51,232 sq. ft. (53.8 per cent of total). Total 95,187 sq. ft.

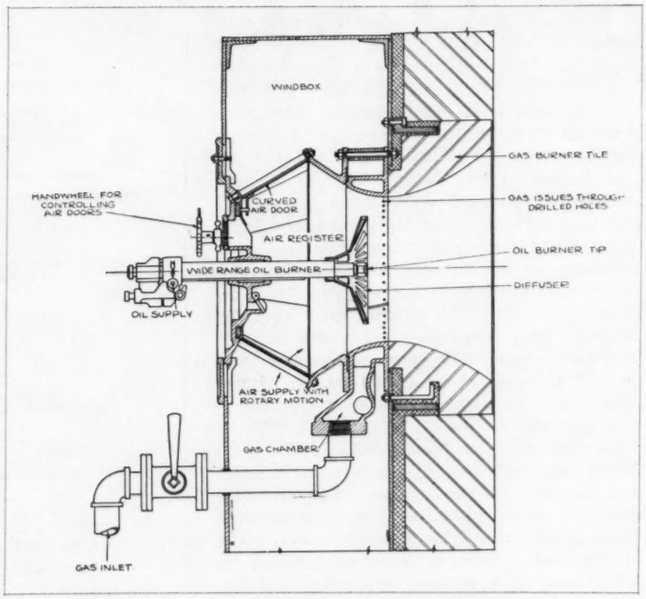



FIG. 4.

FIG. 4 is a cross-section of the combination gas and oil burners used.

as shown in Fig. 2 (shown on front cover of this issue of *Western Gas*) with a final boiler installation as in Fig. 3 which shows one of the 3416 h.p. boilers in Plant No. 3 at this station.

In its essential feature the arrangement shown here is typical of the application of gas fuel in most of the western central stations today. The boiler shown is about four times as large as those used in 1922 and is operated at about three times the rating of the older boilers. Its efficiency is somewhat better, but at full load it will require about 11 times the fuel or, to be exact, 488,000 cu. ft. per hour. In the new 268,000 h.p. plant at Long Beach there are six such boilers burning about 60 million cubic feet of 1120 B.t.u. gas per day. This company has a total of 556,000 h.p. capacity in the three plants comprising the Long Beach Steam Station and when operating at capacity the fuel requirement would be about 130 million cu. ft. per day. Actual consumption has at times exceeded 97 million cu. ft. per day.

Boilers are equipped with combination gas and oil burners, as shown in Fig. 4. The gas burners are tested periodically for capacity and records kept, as a basis for cleaning and repair.

The natural gas used in this station is composed principally of methane ($CH_4$) and ethane ($C_2H_6$) in the approximate proportion by volume of 80 per cent and 20 per cent respectively and has a higher heating value of 1130 B.t.u. per cu. ft. (60° F. and 14.696 lbs. per sq. in.) or 22460 B.t.u. per lb. and a specific gravity of 0.658.

It is the practice in this country to figure boiler performance on the higher or gross heating value of the fuel, while in other countries, notably in Europe, the lower or net heating value is sometimes used. The difference between the two heat values depends on the hydrogen content of the fuel. The higher the hydrogen content, the greater this difference. The combustion of hydrogen, whether in a boiler furnace or in a calorimeter, results in the formation of water vapor or steam. In the calorimeter the products of combustion are cooled to near the initial temperature, the water vapor is condensed and the latent heat of the condensed vapor is a part of the heat value of the fuel as determined by the calorimeter. In the boiler, on the other hand, the products of combustion are never cooled to low enough temperatures to condense the water vapor formed by the combustion of hydrogen in the fuel.

In fact, such condensation would cause corrosion and steps are taken to prevent it. Inasmuch as in the process of steam generation it is not practical to make use of the latent heat of the water vapor, this should not be charged against the boiler. However, the use of the lower heating value of the fuel has a serious drawback in that an ultimate analysis of the fuel is necessary or at least a part of such an analysis that will give the hydrogen content for computation of the lower heating value. Such an analysis is expensive and is not always available. On the other hand the determination of the higher heating value is fairly simple with a calorimeter. The fact that the higher heating value can be obtained directly with the calorimeter is probably the principal reason for its general use in this country in computing boiler efficiencies.

When carrying full load of 200,000 net kw. each boiler consumes about 400,000 cu. ft. of natural gas per hour, or a total of 57,000,000 cu. ft. per day (2,900,000 lbs. per day) for the group of six boilers. For each pound of gas that is burned it is necessary to supply 16.26 lbs. of air for complete combustion, but this figure is increased to 18.17 lbs. in order to provide 15 per cent excess air which, operating experience has shown, is desirable for best result. Thus, each day there passes through the boilers a total of 57,000,000 lbs. of fuel and air or their products of combustion. If this were solid material it would require a 570-car train to haul the daily energy requirements for these boilers.

Because of the higher percentage of hydrogen found in natural gas enormous quantities of water are formed each day and pass up the stacks in the form of vapor. The combustion of each pound of fuel results in the formation of 2 pounds of water or each day 2,900 tons of water vapor are formed and released to the atmosphere. This is equivalent to an inch of rainfall on 25 acres every day. On cool days the vapor condenses and hangs as a cloud over the stacks.

Another product of the combustion of natural gas is carbon dioxide. Even greater quantities of this substance are formed than water vapor. For every pound of fuel burned there are formed 2.7 pounds of carbon dioxide or, in other words, each day 3920 tons of carbon dioxide pass up the stacks to the atmosphere.

A simplified cross section of one of the boilers is shown in Fig. 3. Each boiler has 20 combination oil and gas burners. The gas is fed to the burners from a header below the floor and pre-heated air is supplied from a duct also below the floor. The air for combustion is pre-heated in an air heater at the rear of the boiler by heat in the flue gas coming from the last pass of the boiler. The air is forced into the air heater by two forced draft fans driven by variable speed motors. An induced draft fan draws the flue gas from the boiler, through the air heater, and exhausts to the stack. The furnace walls and floor are water cooled, using refractory-faced metal blocks attached to water filled tubes for the heat absorbing surface.

The results of tests on one of the boilers when burning gas are presented graphically in the heat balance diagram, Fig. 5. In this diagram the flow of heat in the boiler and related equipment is shown by channels whose width is proportional to the amount of heat represented by the channel.

The heat in the fuel supplied to the boiler

is arbitrarily taken as 100 per cent and is represented by the width of the line at the extreme left of the diagram. The loop at the upper left represents the heat that is recovered in the air heater and also a small amount of heat that is part of the radiation losses and is recovered by the forced draft fans by reason of their location on top of the boiler. The loop in the lower left represents the heat supplied to the boiler in the feedwater. The feedwater for these boilers is heated by extracted steam from the turbine and the heat that it contains is derived from that supplied to the steam for the turbine.

The losses are grouped in the upper right corner. The largest of these is the loss due to water formed by the combustion of hydrogen and is 10.59 per cent of the total heat input in the fuel. The other losses are those due to the heat carried away by the dry flue gases, excess air, and leaks.

The heat output to the turbine throttle is shown as 109.49 per cent of the heat in the fuel. This apparent enigma is due to the fact that the heat in the feedwater forms a considerable part of the heat input to the boiler. The net figure of 83.50 per cent available for the turbo-generator output and losses represents also the boiler efficiency based on fuel.

The comparatively high percentage of hydrogen found in natural gas places a handicap on this fuel for attaining high boiler efficiencies. Over two-thirds of all the boiler losses when using gas fuel are due to the formation of water vapor and the heat that it carries away with it. When oil is burned instead of gas a 4½ per cent gain in boiler efficiency is realized because of the lower hydrogen content of fuel oil.

In comparing different fuels it is well to bear in mind that certain constituents contribute more desirable characteristics to the fuel than do others. Carbon is desirable not only for heat that is released by its combustion, but also because the product of combustion of carbon, carbon dioxide, carries away smaller quantities of heat in the flue gas. Hydrogen, although it has a high heating value, carries away over twice as much heat in its product of combustion, water vapor, for a given flue gas temperature as carbon dioxide. For this reason higher boiler efficiencies are possible as the percentage of hydrogen in the fuel is decreased.

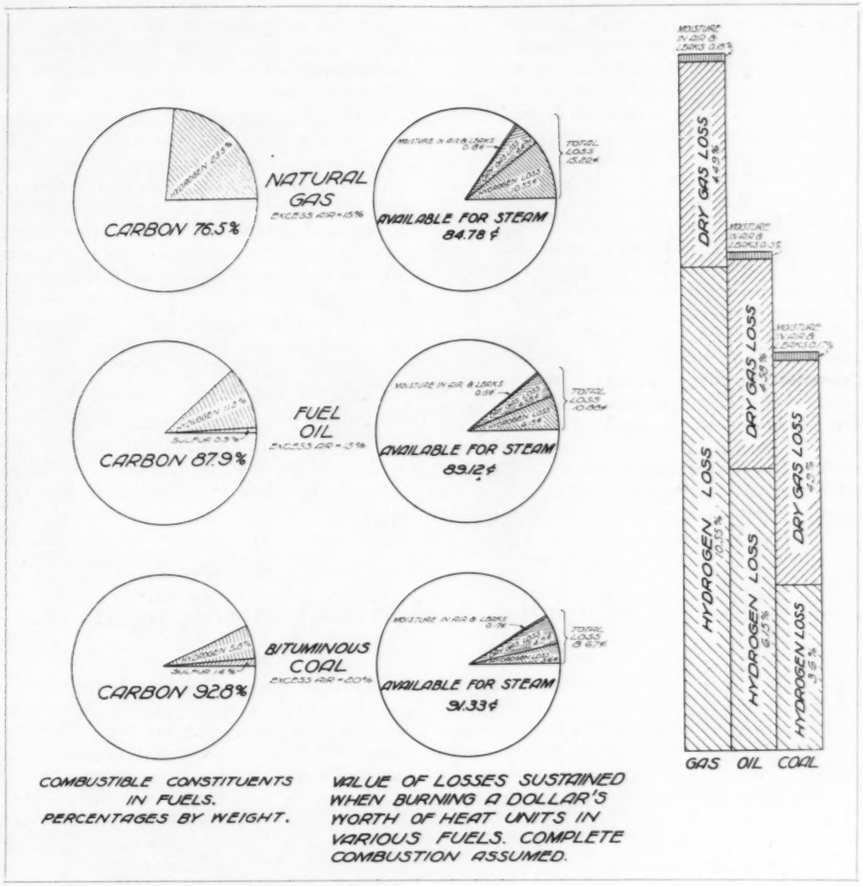



FIG. 6.

A theoretical comparison of three fuels widely used for steam generation, namely, natural gas, fuel oil and bituminous coal is made in Fig. 6. On the left is shown the percentage composition by weight of the combustible constituents in the three representative fuels. The comparatively high percentage of hydrogen in natural gas is apparent. The most desirable constituent, carbon, is most plentiful in anthracite coal.

In this connection it must be noted that the heat derived from carbon and hydrogen as free constituents in a fuel is different from that derived from the same elements when in combination as hydrocarbons.

To further compare the three fuels let us suppose that we invest a dollar in a given number of heat units or B.t.u.'s. Then the value of the losses sustained in order to release this number of heat units from the three fuels with modern boilers and burners is represented by the shaded portions of the circles in the center of the figure. In this comparison it is assumed that all the available carbon in the coal is burned and none lost in the ash. It is common practice to use 15 per cent excess air with both oil and gas and 20 per cent excess air with coal and these amounts have been assumed for the comparison. As can be seen, the hydrogen loss is the determining factor in making up the total value of the losses or, conversely, in making heat available for producing steam. Coal and oil both have decided advantages over natural gas in this respect. The rela-

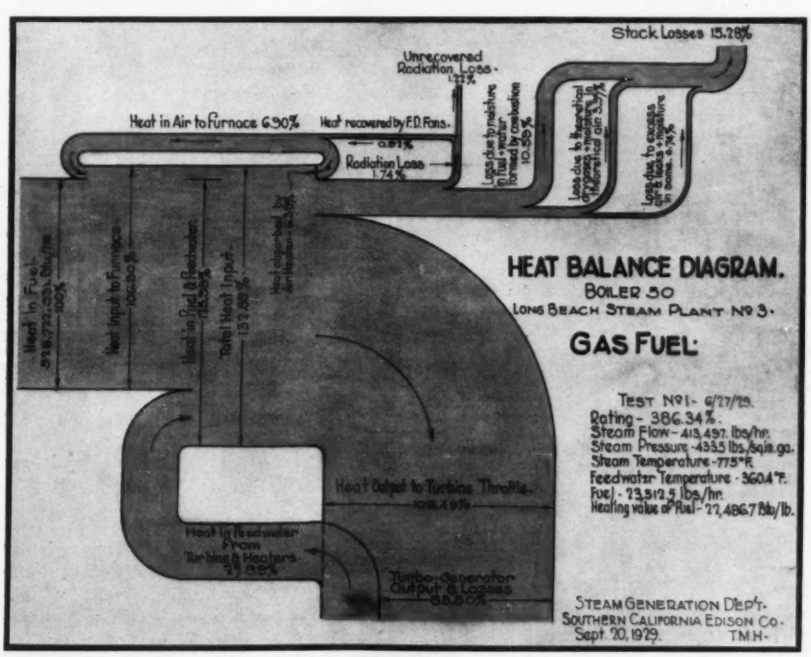

Stack Losses 15.28%
Unrecovered Radiation Loss 1.22%
Heat in Air to Furnace 6.90%
Heat recovered by F.D. Fans.
Radiation Loss 1.74%
HEAT BALANCE DIAGRAM.
BOILER 30
LONG BEACH STEAM PLANT No 3.
GAS FUEL.
TEST No 91 - 6/27/29.
Rating - 386.34%
Steam Flow - 419,497. lbs/hr.
Steam Pressure - 433.5 lbs./sq.in.ga.
Steam Temperature - 775°F.
Feedwater Temperature - 360.4°F.
Fuel - 23,512.5 lbs./hr.
Heating value of Fuel - 22,486.7 Btu/lb.
Heat Output to Turbine Throttle
Heat in Feedwater from Turbine & Heaters
Turbo-Generator Output & Losses
STEAM GENERATION DEPT.
SOUTHERN CALIFORNIA EDISON CO.
Sept. 20, 1929. T.M.H.

FIG. 5.

tive value of the losses with the three fuels is shown more clearly by the three columns representing losses at the right of the figure. The dry gas loss is practically the same for each fuel, it being somewhat higher in the use of coal because of the greater amount of excess air used with this fuel.

In actual practice gas is a more desirable fuel than this theoretical consideration indicates. Being a gas it is more readily mixed with air and combustion is rapid and complete, which results in cleaner boiler surfaces. Furnace maintenance costs are reduced due to lower temperatures and absence of slagging. Preparation and handling charges together with the problem of ash removal and disposal are absent. These factors, together with its cleanliness, make natural gas a highly desirable and thoroughly practical commercial fuel.

The actual operation of the plant described is almost entirely automatic when it is under load. Load changes are cared for by the speed-time control acting upon the governors of the main turbo-generator units, resulting in increased admission of steam as load increases and speed tends to fall.

Increased use of steam tends to lower pressure on the boilers, which is in turn maintained constant by automatic combustion control operated primarily from steam pressure and controlling both gas and oil fuel, fan speeds, and damper openings. Time adjustments are made automatically once each minute and fuel and air adjustments occur every 10 seconds.

All industrial applications are more or less dependent, the one upon the other. The gas industry among its many uses is also serving through the fuel-electric stations a part of the varied wants of thousands of consumers of electric energy, and in this manner supplying a myriad of services impossible through the direct application of gas fuel alone.

## New Emco-Nordstrom Lubricated Plug Valve Announced

The Pittsburgh Equitable Meter Co., Pittsburgh, Pa., announces the widening of its line of lubricated plug valves by introduction of the Emco-Nordstrom lubricated plug valve, a product of the company's subsidiary, the Merco Nordstrom Valve Co.

Emco-Nordstrom lubricated plug valves have standard gate valve face-to-face dimen-

sions and may be used to replace valves of other types in existing lines due to their corresponding dimensional size. All of the features of Nordstrom lubricated plug valves, including the patented "Sealdport" method of lubrication, are embodied in the design. The new product is made in sizes from 2 inches to 12 inches inclusive, and is described in Bulletin V-102 which may be obtained by writing to the Merco Nordstrom Valve Co., Pittsburgh, Pa., or Oakland, Calif.

# Recent Natural Gas Activities in Michigan

IMPORTANT natural gas developments in Michigan in the later months of 1933 are summarized by Arthur W. Stace, director of the Utilities Information Bureau, Ann Arbor, Mich. They include the following:

Completion of four new natural gas wells with an estimated aggregate open flow of more than 46,000,000 cubic feet per day.

Two important strikes of gas in the Austin pool, Mecosta county, which established it as probably the most important gas pool yet discovered in the state, these strikes being Spittler No. 1, with a gauged open flow of 14,160,000 cubic feet per day, and Fish No. 3, with a gauged open flow of 27,500,000 cubic feet per day.

Construction of a natural gas pipe line from the Austin pool to Big Rapids.

Taggart Brothers, Inc., have recently purchased the Big Rapids Gas Co., and arrangements are well under way for the change-over from manuactured gas to natural gas, scheduled for early January. The Taggarts had previously been voted a natural gas franchise in Big Rapids, and had secured a pipe line permit from the State Utilities Commission. The pipe line has been completed from the Austin pool to Big Rapids, a distance of 6 to 7 miles.

The Austin pool is 17 to 18 miles distant from the Consumers Power Co.'s pipe line which carries natural gas from the Broomfield pool to Midland, Saginaw, Bay City and other communities formerly served with manufactured gas from the Saginaw River gas works at Zilwaukee.

Estimates of Michigan's proved, semi-proved and potential natural gas reserves, revised in view of drilling discoveries during the three months ending December 1, range from around 18 billion cubic feet to 36 billion cubic feet. Additional reserves of casing head gas reserves in the state all estimated at another 15 billion cubic feet.

Twenty-one Michigan communities and 27 townships now have natural gas service.

The territories served with natural gas have a combined population of around 188,000 persons. This population is using upwards of 4,000,000 cubic feet of gas per day.

## This Month's Cover

Southern California Edison Co.'s Long Beach Steam Plant as seen from the air, is the subject of this month's cover—and very appropriately so, since the current issue contains a detailed account of how natural gas serves this important consumer.

The Long Beach station holds the distinction of being equipped to use more natural gas than any other single customer—nearly 130 million cubic feet daily. On Page 30 begins the article by F. G. Philo, superintendent of fuel electric stations for Southern California Edison, and the cover photograph is referred to in the text as Fig. 2. —*Editor.*

## G. H. Unkefer Appointed Reynolds California Representative

Floyd Gaunt, vice-president of the Reynolds Gas Regulator Co., Anderson Ind., announces the appointment of G. H. Unkefer as the company's representative in California. Mr. Unkefer has been identified with the gas industry on the Pacific Coast for the past 11 years. More recently he has been in charge of sales for the American Recording Chart Co., Los Angeles, which connection he will retain.

## Diehl of American Meter On Coast

John C. Diehl, chief engineer of the American Meter Co., during November and December made an extended trip to the Pacific Coast, returning to Erie, Pa., for the Christmas holidays.

## Houston, Texas Asks $93,000 P.W.A. Loan For Gas Project

Application for $93,000 has been made to the Public Works Administration by the city of Houston, Texas, for the rehabilitation of the municipally owned Magnolia Park (suburb of Houston) gas system. The city is asking an outright grant of $23,250 for the project and a loan of $69,750 for which bonds representing future revenues of the gas system will be offered as security. More than 43 miles of pipe would be laid within the distribution area of Magnolia Park.

## Betty Boyle Resumes Home Service Work With Gas Service

Betty Boyle, for two years home service director of The Gas Service Co., resumed her work for the company at the beginning of the year, going first with the Wyandotte Gas Co. in Kansas City, Kan. Previously Miss Boyle directed the cooking school program of The Gas Service Co., but her 1934 work will be along educational lines, contacting clubs, church and civic organizations, etc. She was formerly associated with the Detroit-Michigan Stove Co.

# The Well Timed Punches *Will* Count

*"Time your advertising to give it a real sales punch. Put all the power you can behind it. Then have the courage and stamina to keep hammering away."*

That's fighting talk, but with business still taking it "on the chin" we think it is mighty good advice. And it is advice that every dealer in P. G. and E. territory can easily follow. Why?

Because timing, power, and consistency are present in all P. G. and E. advertising campaigns. And because these campaigns are so designed that dealers may use them as a "backbone" for their own merchandising programs. How?

Advertise regularly in space adjoining ours.

Your advertising is then assured of perfect timing with consumer's seasonal needs. It "packs the wallop" of large space and eye-arresting layout. It is strengthened by consistency and repetition that wears down sales resistance and eventually scores a sales knock-out.

Again, in 1934, this company's advertising will back you up whenever you tie in.

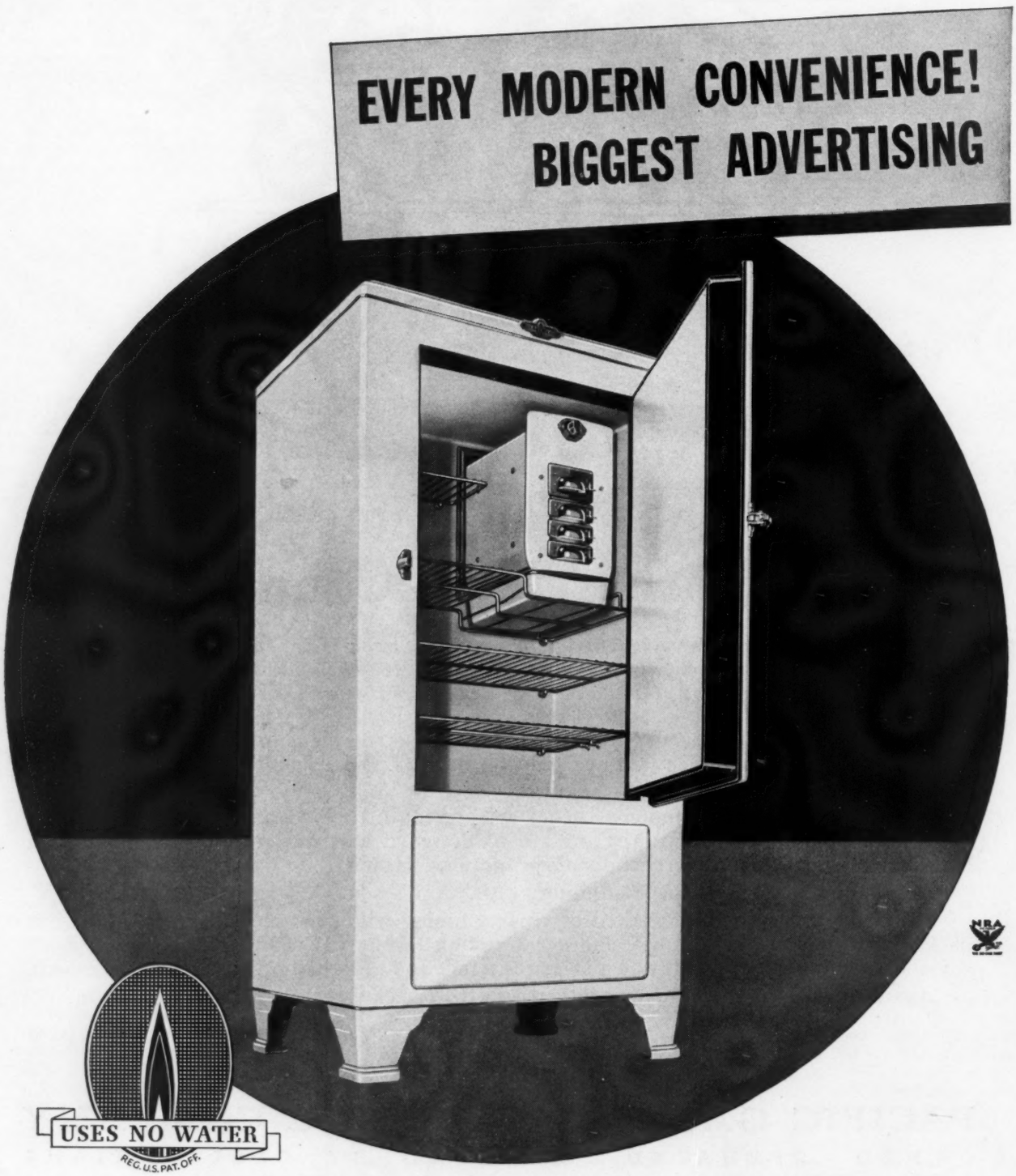
WG 201-134

**P · G · and E ·**

**PACIFIC GAS AND ELECTRIC COMPANY**

OWNED . OPERATED . MANAGED BY CALIFORNIANS

# EASIER THAN EVER



# TO SELL!

## 7 NEW MODELS! CAMPAIGN!

## Electrolux in 1934 will build even greater public acceptance for gas as the modern fuel!

RIGHT NOW, plan to capture your share of the valuable 1934 refrigeration market with Electrolux. Start merchandising. Get the new models on your floor.

Remember 1933! Sales surpassed all our expectations. Demand for the New Air-Cooled models far outran the supply. 1934 promises to more than outstrip this amazing record.

This year Electrolux steps out with new sales-making features . . . a beautiful new cabinet that any woman will own proudly . . . and a new vegetable freshener . . . a new rubber grid in trays that makes ice cubes easy to remove . . . a new light that switches on when the door opens.

Examine these new models closely! A new exterior finish is available called Newtone — a gleaming white non-porcelain finish that will not scratch, chip or discolor. The inside finish is seamless porcelain, easy to clean.

Think what these modern advances will mean to you in selling Electrolux in 1934! Think, too, what it will mean to have the backing of the biggest advertising campaign Gas Refrigeration has ever run. Full pages in 7 great national magazines! Making important calls in *your* territory . . . calls on *your* customers!

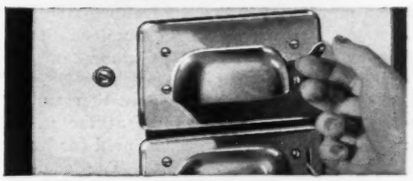
And remember, every Electrolux you install promotes gas as a modern fuel, takes the convenience user out of the non-profit class, protects your $250 meter investment. Now is the time for serious planning! Write or wire Electrolux Refrigerator Sales, Inc., Evansville, Ind.

NEW *Air-Cooled* ELECTROLUX

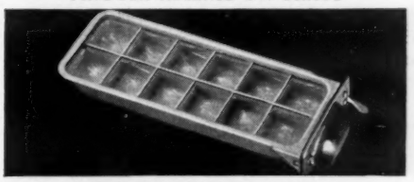
THE SERVEL *Gas* REFRIGERATOR

SPLIT SHELVES

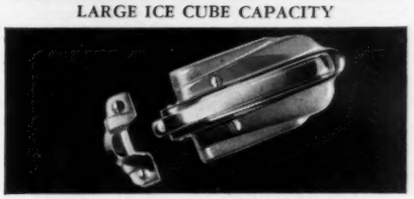
TEMPERATURE CONTROL



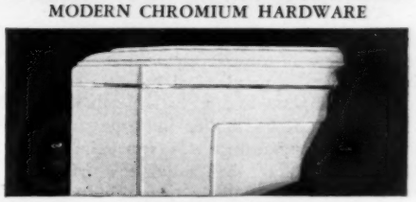
TRIGGER RELEASE ON TRAYS



LARGE ICE CUBE CAPACITY



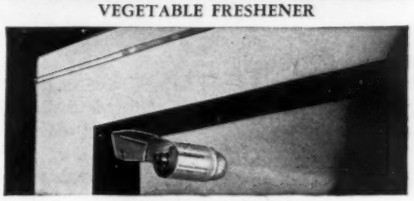
MODERN CHROMIUM HARDWARE



BEAUTIFUL FINISH

RUBBER TRAY INSETS

VEGETABLE FRESHENER



INTERIOR LIGHTING

# Regulation Seen at Its Worst in Seattle Case

*(Continued from Page 8)*

the last order issued by the retiring Board of Public Works. An application for rehearing was immediately filed by the Public Utilities Committee of the Seattle City Council, and was granted by the newly appointed Department of Public Works of the Democratic Administration.

The Department ordered a complete investigation of Seattle Gas Co. on its own motion concurrent with granting the rehearing to the City of Seattle, and proceeded to make a complete inventory and appraisal of the company's properties. This involved the employment of 22 engineers and accountants, who spent eight months on the work.

Under Washington statutes valuation and investigation matters carried on at the instance of the Department must be paid for by the utility under investigation. The company has not yet received the bill from the State for this investigation, but it is expected to fall between $25,000 and $30,000 for the investigators employed by the State. In addition it was necessary for the company to hire its own engineers and accountants to work with and check the work of the State engineers, and to prepare its case, bringing the total cost to the company somewhere in the neighborhood of $50,000, if the Department succeeds in collecting the bill.

Although the Seattle company's rates and valuation had been thoroughly reviewed in 1914 and in three or four subsequent hearings, and a very good historical cost value had been built up by inventory and appraisal and detailed audit of the books of predecessor companies, this Department held that the book costs shown on the company records were entirely unreliable and must be abandoned. A new historical cost valuation was arrived at by taking a physical inventory with which the company had very little quarrel; but by pricing it on totally inadequate unit costs the resulting figure was approximately $2,000,000 less than the actual cost of the physical properties to their original owners.

The Department also made a reproduction new valuation on the theory that the entire property could be reproduced in a two-year period using wholesale methods and buying all materials at wholesale prices with maximum discounts, laying all mains with ditch-digging machines in spite of insurmountable interference with cross services of sewers, water pipes, telephone connections, etc., except in the heart of the down-town business section, and arrived at a reproduction new valuation considerably less than the inadequate historical cost developed by its own studies. The next step was to discount this reproduction new valuation by deducting accrued depreciation on the basis of total estimated years of life compared with age of the property at the present time; this device reduced the rate base on the physical properties from an actual cost to the company of $12,800,000 to a depreciated reproduction new value of around $7,500,000. In aid of this reduction in value the Department also resorted to the device of calling several large standby units "non-operative."

From operating expenses all management fees paid to the holding company were eliminated, although it was conclusively shown that large benefits had accrued from management services rendered which would have to be paid for from some other source if not rendered by the holding company. All dues and donations were eliminated except those involved in a limited few trade organizations. Expenditures by the company for employee-welfare, such as annual picnic, Christmas party, etc., were eliminated. Likewise the fees paid to the trustees under the company's bond indentures.

And even on the above basis, after eliminating everything that could even remotely be questioned, they found the company was earning a fraction less than 8 per cent.

The Seattle case has been resubmitted, and decision is expected shortly. But whichever way the decision may swing it will not lessen the expense of the unnecessary investigation; nor will it replace customer confidence which is always dissipated in some measure by publicity attendant upon rate proceedings.

To some degree the present attitude of regulatory bodies toward their charges, the utilities, is a by-product of depression days. It may be hoped that here, too, returning prosperity will bring sane thinking; that rate proceedings will diminish in number, and that utilities may appear in them again with some assurance of a fair hearing.

## Charles E. Gallagher Becomes President East Ohio Gas Co.

CHARLES E. Gallagher became president of The East Ohio Gas Co., Cleveland, on December 6, following the resignation of Ralph W. Gallagher. The latter is now a director of the Standard Oil Co. (N. J.) in charge of its natural gas division, as announced last month.

The East Ohio's new president is widely known in the natural gas industry, having followed its development from the early days when long-distance transmission was in its infancy.

*C. E. Gallagher*

He was born in Salamanca, N. Y., and was working in the natural gas fields of Pennsylvania and West Virginia before he was out of his 'teens.

Mr. Gallagher has been with The East Ohio Gas Co. since 1898 when he went to work for the company in Akron, Ohio. This was in the days when natural gas was taking its first steps in long-distance transmission and had crossed the Ohio River from West Virginia into Ohio. Later, as the system expanded and the industry grew, Mr. Gallagher developed with it and held increasingly responsible positions with the company.

In 1920 he became general superintendent of the East Ohio system outside of Cleveland, and in 1926 was made assistant general manager of the company with headquarters in Cleveland, eventually becoming vice-president and general manager, and now president.

## Texas Commission Restrained from Enforcing Lone Star Reduction

An injunction preventing the Texas Railroad Commission from enforcing its recent order reducing the Lone Star Gas Co. gate rates in 250 Texas communities has been granted by a three-judge federal court in Houston, Texas. The decision also stayed further proceedings in the federal court until state courts have acted upon the company's request that the Texas Railroad Commission order be voided.

The intention of the injunction was to protect the Lone Star Gas Co. against harrassment should state courts decide the litigation is beyond their jurisdiction. The case was expected to come up for hearing early in January.

Gate rates on the Lone Star system were ordered reduced from 40 to 32 cents per M c.f. in the Texas Railroad Commission's order, entered last September.

## Ceramic Engineer Joins Staff of Republic Steel Corp.

Karl Kautz, ceramic engineer, has joined the staff of the Republic Steel Corp. and will specialize in research and field service on enameling sheets, according to announcement by Earl C. Smith, chief metallurgist of Republic. For two years Mr. Kautz was in charge of the enameling plant of American Range & Foundry Co., East St. Louis, Ill. Following that he was ceramic chemist with Northwestern Terra Cotta Co., St. Louis, Mo., for four years. Prior to his connection with Republic he was ceramic chemist with Abingdon Sanitary Mfg. Co., Abingdon, Ill.

Mr. Kautz's headquarters at present are at Republic's Central Alloy Division at Massillon, Ohio.

## Zenith Gas System, Inc. Name of Alva, Okla., Company

Zenith Gas System, Inc. is the new name of the gas company serving Alva., Okla. and vicinity. Lewis A. Robertson and W. L. Woodward purchased the Winchester Oil and Gas Co. and the Carleton Pipe Line Co. at Alva late in 1933. The two men have been associated in the gas business since 1914. The company has approximately 2700 meters on its system and serves Alva, Avard, Cherokee, Mooreland, Quinlan, Waynoka, Woodward, Okla. and Hardtner, Kans.

## Globe Gas Co. Seeks Federal Loan

Application has been made by the Globe Gas Co., McAlester, Okla., for a loan from R. F. C. funds to construct a natural gas transmission line and distribution system to serve the towns of Coalgate, Atoka and Stringtown, Okla.

## $1,757,564 Gas Dept. Budget

John J. O'Brien, president of the Standard Gas and Electric Co., Chicago, Ill., announces that a budget totaling $1,757,564 has been adopted for the company's gas department during 1934.

## Economics of Cathodic Pipe Protection

*(Continued from Page 13)*

on the pipe is in fair condition, the current may be reduced to a much lower value and a battery charger set may be placed on a pole to supply the necessary power.

This would reduce the maintenance charges as well as the original cost of the installation. The power cost would also become negligible.

If the positive condition of the pipe is due to stray current from an electric railway and the substation is near the transmission line, the cost of power may be reduced to zero and the necessary installation cost will be the cost of a drainage cable which will amount to only a very small sum. In this case the pipe is bonded to the negative bus of the generators. If the necessary current is too great with a single drainage connection, it will be necessary to connect the lead from the negative bus to the pipes at several points in the positive area, through suitable balancing resistances.

This is the old time-honored method of avoiding electrolysis by draining to the railway return system in which cathodic protection is supplied to the pipes at the expense of the rails. The latter serve as the auxiliary electrodes.

In each case preliminary tests will show the amount and size of equipment required for a cathodic protection installation and the costs of this must be compared with the reconditioning costs in order to determine the most economical method.

---

## Auxiliary Appliances

*(Continued from Page 19)*

possibilities of an active policy in this field. There is no surer way to forestall competitive inroads than by multiplying the uses of gas on every customer's premises. This is a truth which has been accepted so far as concerns ranges, water heaters, space heaters and more recently refrigerators, and it applies no less to promotion of auxiliary appliances.

### Capital Investment in Appliance & Apparatus Industry

In announcing recent approval of the Code of Fair Competition and Trade Practices for the Gas Appliance and Apparatus Industry the National Recovery Administration estimated the invested capital of the industry at approximately $85,000,000 and the annual payroll at about $9,000,000. Approximately 6,000 employees have been added through the code and the payroll will be increased at least $500,000 a year, according to the NRA estimate.

### Canadian Group Meets June 4-5

George W. Allen, secretary-treasurer of the Canadian Gas Association, has announced that the 1934 convention of the Association will be held on June 4 and 5, 1934, at the Windsor Hotel, Montreal, Canada.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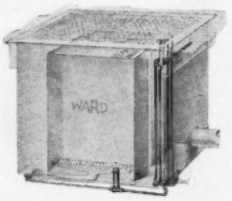
**—typical of the whole Ward line, is equipped with *Ward Bilt-In Thermo-Control* and *Safety Pilot*, the greatest improvements ever made in floor furnace construction.**

**Just set the *Thermo-Control* for temperature desired, and that temperature will be maintained within a variation of two degrees.**

**And the *Ward Safety Pilot*, the simplest and most positive device of its kind, gives complete protection from effects of possible gas pressure changes.**

**Construction of the Twenty-five measures up in every detail to traditional Ward standards, and carries the liberal Ward guarantee. It is also approved by the A.G.A.**

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# We're Against It!

So are you, so are your customers against high gas costs. And your customers don't have to pay them if you install a BARBER Gas Pressure Regulator for them.

Write now for literature and details of this device that makes satisfied customers and good profits for heating men everywhere.

The Barber Gas Burner Co.
3702-4 Superior Avenue
CLEVELAND . . . . . OHIO

## Portland Cement Kiln Klinker Burning

*(Continued from Page 16)*

*A. Dry Flue Gas Loss*
21.95 × .24 × (900-100) .....4214 B.t.u.
For 600 deg. flue gas, loss is.....2640 B.t.u.

*B. Evaporating and Superheating Moisture formed by burning Hydrogen*
(212-100)+970.4+0.48(900-212)3115 B.t.u.
For 600 deg. flue gas, loss is.....2800 B.t.u.

*C. Heating Raw Mixture to 1700 Deg. F.*
8.0 × 0.2 × (1700-100) .....2560 B.t.u.

*D. Cracking $CaCO_3$*
6.20 × 772 .....4786 B.t.u.

*E. Evaporating and Superheating Slurry Moisture*
5.9 (212-100) +970.4+0.48 (900-212)
.....9334 B.t.u.
For 600 deg. flue gas, loss is.....7500 B.t.u.
Total determined loss, B.t.u. per lb. natural gas at 900° flue gas.....23009

Inasmuch as the total available heat per lb. of gas is only 22200 B.t.u. it is obvious that the ratio of 1600 cu. ft. is impossible. To arrive at a reasonably accurate heat balance, calculate the hypothetical losses as above for various percentages of excess air and ratios of gas per bbl. and plot in Fig. 3. Next, assume a reasonable loss for radiation and undetermined of say 8.3 per cent or 1830 B.t.u. The remainder or 20800 B.t.u. will account for the losses calculated and plotted. Draw in this line horizontally in Fig. 3. The various fuel factors are determined from the intersections of this line and the corresponding excess air noted. From Fig. 2, the various $CO_2$ percentages are determined from the excess air percentages and corresponding fuel factors. These results are then plotted. The reason for using $CO_2$ percentages instead of excess air is that the former are readily determined from an instrument.

Having determined the $CO_2$ and the proper fuel factors, we can next work out an accurate heat balance in the regular manner. The values are shown in Table No. 8.

These values are expressed and plotted as percentages of the total heat supplied.

$CO_2$ as indicating the air-gas ratio, offers an effective indication of operation. By watching the record and following this closely, it is possible to approximate a fuel factor of about 1850 for the straight kiln and between 1550 and 1600 with a chain-equipped kiln. Unless such a close check is maintained upon the operation, only a miracle can insure good results.

---

## Oklahoma Western Gas Applies For R. F. C. Loan

Application for a federal public works loan has been made by the Oklahoma Western Gas Co., to construct an 8-inch main line to Bridgeport, Okla., from the Sayre field, and 6-inch and 4-inch laterals to supply Canute, Foss, Hydro, Arapaho, Geary, Calumet, Greenfield, Hinton, Lookeba, Binger and Gracemont, Okla. R. M. Tuttle, of Cushing, Okla., is president of the Oklahoma Western Gas Co.

# Natural Gas Code

*(Continued from Page 29)*

(A) That employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection.

(B) That no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of its own choosing, and

(C) That employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment approved or prescribed by the President.

**Reclassification of Employees**

Section 3. No employer shall reclassify employees or duties of occupations performed or engage in any other subterfuge for the purpose of defeating the purposes or provisions of the Act or of this Code.

**Standards for Safety and Health**

Section 4. Every employer shall make reasonable provisions for the safety and health of his employees at the place and during the hours of their employment.

**State Laws**

Section 5. No provision of this Code shall supersede any presently existing State or Federal law which imposes on employers more stringent requirements as to age of employees, wages, hours of work, or as to safety, health, sanitary or general working conditions, or insurance, or fire protection than are imposed by this Code.

**Posting**

Section 6. All employers shall place complete copies of this Code at points easily accessible to employees.

## ARTICLE VI—THE CODE AUTHORITY

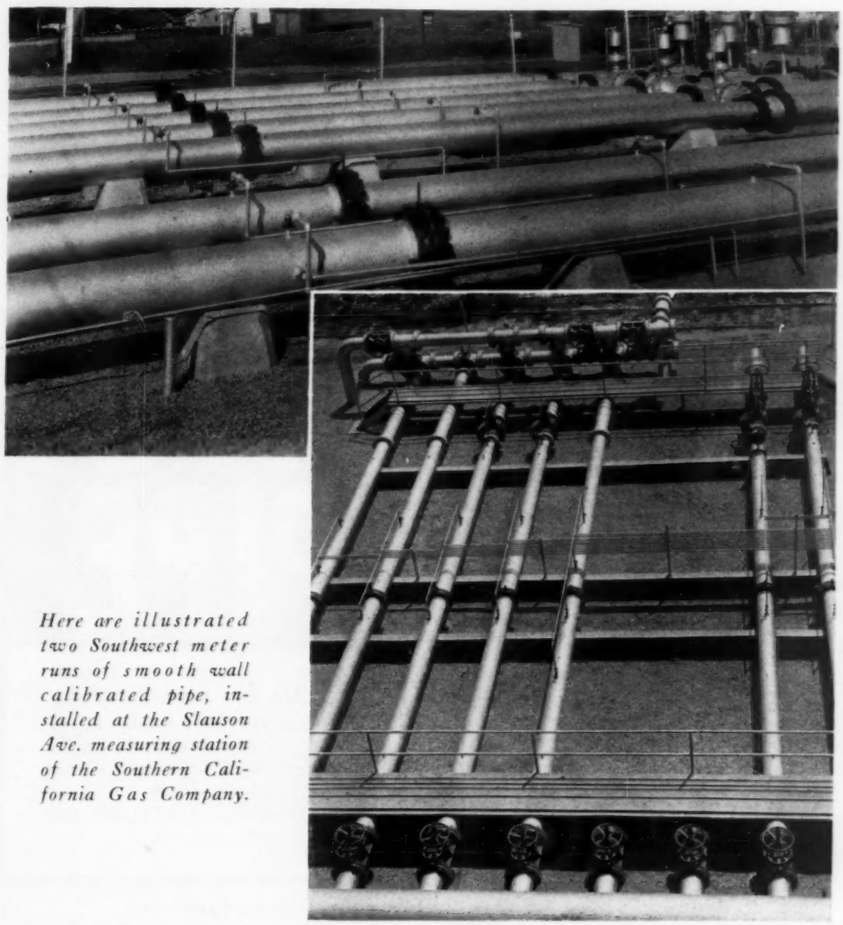
Section 1. There shall forthwith be constituted a Code Authority which shall consist of not less than eleven and not more than fifteen members of the Natural Gas Industry, of which not less than two and not more than four to be approved by the Administrator, shall be non-members of the Natural Gas Division of the American Gas Association.

Section 2. In addition to the membership as above provided, there shall be not to exceed three members without vote to be appointed by the Administrator, which members shall serve without expense to the Industry.

Section 3. The American Gas Association is a voluntary membership association, organized under the laws of the State of New York which association imposes and shall impose no inequitable restrictions on its membership, and the Natural Gas Division of which is truly representative of the Natural Gas Industry of the United States.

Section 4. The members of the Code Authority, except the representatives to be appointed by the Administrator shall be selected by the member companies of the Natural Gas Division of the American Gas Association, on or before the effective date of this Code.

Section 5. Members of the industry shall



*Here are illustrated two Southwest meter runs of smooth wall calibrated pipe, installed at the Slauson Ave. measuring station of the Southern California Gas Company.*


## Inaccurate Measurement .... Costs Money

**Southwest meter equipment is scientifically designed and built for use in handling either gas or fluids. Southwest meter assemblies permit the correction of errors caused when metering through pipes not of nominal diameter. These complete meter runs of smooth wall calibrated pipe, accurately micrometered, guarantee positive measurement. With Lucas Loose Ring laps and special pressure tap construction, easy erection and true differentials are assured. All steel construction eliminates the possibility of flange breakage. The Southwest organization is in a position to engineer complete orifice meter assembly installations.**

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be entitled to participate in the activities of the Code Authority by assenting to and complying with the requirements of this Code and sustaining their reasonable share of the expenses of the preparation and administration of this Code. Such reasonable share of the expenses of the preparation and the administration of this Code shall be determined by the Code Authority, subject to review by the Administrator, on the basis of volume of business and/or such other factors as may be deemed equitable.

Section 6. Nothing contained in this Code shall constitute the members of the Code Authority partners for any purpose. Nor shall any member of the Code Authority be liable in any manner to anyone for any act of any other member, officer, agent or employee of the Code Authority. Nor shall any member of the Code Authority, exercising reasonable diligence in the conduct of his duties hereunder, be liable to anyone for any action or omission to act under this Code, except for his wilful misfeasance or non-feasance.

Section 7. The Code Authority shall have and exercise all powers and duties conferred upon it by this Code, and, generally, all such other powers and duties as shall be necessary or proper to enable it fully to administer this Code and effectuate its purposes, in cooperation with the Administrator, and to enable it, the said Code Authority, to carry on and perform its functions, as herein prescribed and contemplated. The Administrator on review may disapprove any action taken by the Code Authority.

Section 8. The Code Authority may adopt such form of organization and procedure as it deems best, and may delegate any of its powers and duties to such agents, representatives and committees as it may constitute and appoint from time to time.

Section 9. In addition to its general powers and duties the Code Authority shall have the right and authority: to obtain from members of the Industry such information and reports for the use of the Code Authority and the Administrator in the administration and enforcement of the Code, and for the information of the President, and for other pertinent purposes, as it shall deem necessary or desirable, provided that all such information shall be kept confidential and only general summaries thereof published; to receive complaints of violations of this Code, make investigations thereof; adjust such complaints and refer to the Administrator any unadjusted violations; and to initiate, consider and make recommendations for modifications of and amendments to this Code.

Section 10. In addition to information required to be submitted to the Code Authority, there shall be furnished to government agencies such statistical information as the Administrator may deem necessary for the purpose recited in Section 3-A of the National Industrial Recovery Act.

Section II. In order that the Code Authority shall at all times be truly representative of the Industry and in other respects comply with the provisions of the Act, the Administrator may prescribe such hearings as he may deem proper; and thereafter if he shall find that the Code Authority is not truly representative or does not in other respects comply with the provisions of the Act may dismiss such member or members of the Code Authority as are not truly representative and require the selection of a new member or members of the Code Authority in the manner herein prescribed for the selection of the original members of the Code Authority.

Section 12. The Code Authority shall cooperate with the Administrator in regulating the use of any N.R.A. insignia solely by those

members of the Industry who have assented to and are complying with this Code.

### ARTICLE VII—MODIFICATION

Section 1. As required by the National Industrial Recovery Act paragraph (b) of Section 10 of TITLE I thereof is made a part of this Code as follows:

> The President may from time to time cancel or modify any order, approval, license, rule or regulation issued under this title.

Section 2. This Code, except as to provisions required by the Act, may be modified on the basis of experience or changes in circumstances, such modification to be based upon application to the Administrator and such notice and hearing as he shall specify, and to become effective on approval of the President.

### ARTICLE VIII—APPLICATION

Section 1. If any member of the Industry is engaged in any other industry, this Code shall apply only to its operations in the Natural Gas Industry as herein defined.

Section 2. Any member of the Industry shall be exempt from compliance with Code provisions and requirements which increase the operating costs of or which cause undue hardship on such member, as a result of competition with a publicly owned and/or operated enterprise. Such member, with the approval of the Code Authority, may petition the National Recovery Administration for relief and after making proof of such competition and/or such undue hardship, before the Administrator, shall forthwith be relieved by the Administrator from said Code provisions and requirements until such time as said competitive enterprise shall conform thereto.

Section 3. This Code shall apply in so far as it is not; (1) in conflict with the jurisdiction of State and/or public authorities, invested with local regulatory powers and control, and (2) contrary to the Constitution of the United States.

### ARTICLE IX—DURATION

This Code, as submitted, shall become effective and shall be binding upon every member of the Natural Gas Industry, on the second Monday after its approval by the President of the United States and shall continue in effect until June 15, 1935, or the earliest date prior thereto on which the President shall by proclamation, or the Congress shall by joint resolution, declare that the emergency recognized by Section I of the National Industrial Recovery Act has ended.

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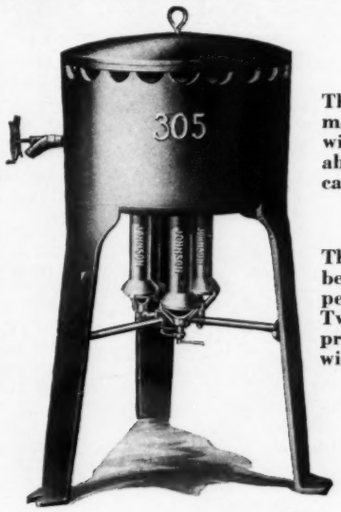
## Bristol Co. of Canada, Ltd. Formed; Headquarters At Toronto

The Bristol Co., Waterbury, Conn., announces the incorporation of The Bristol Co. of Canada, Ltd., with factory and general headquarters at 64 Princess St., Toronto, Ont. J. S. Mayberry has been appointed manager of the Canadian company. He is a graduate engineer of Toronto University and has been associated with the parent company for the past 10 years.

## Municipal Ownership Loses In Wellsville, Kansas

Proposal to issue $20,000 in bonds for the construction of a municipal gas system was rejected by voters of Wellsville, Kans., on December 12. Wellsville is served by the Union Public service Co., a Gas Service Co. subsidiary.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**Cedar Rapids IOWA**

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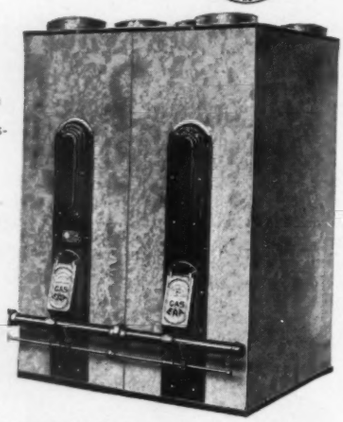

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## Gas vs. Electric Range Test Proves Gas Superior

CONCLUSIVE proof of the superiority of the gas range over the electric was given in a recent test made in "The Old London" restaurant, New York, N. Y. A 36-inch Edison electric range for commercial work and a No. 45-28 CX Garland gas range from the Detroit-Michigan Stove Co. was used in the competition. Results of the test appear below.

One of the outstanding claims made for the electric range is that with its use there is less shrinkage of meats and roasts, but the recent test revealed the gas range superior in this respect as in others.

| | BEEF | | PORK LOIN | |
|---|---|---|---|---|
| | Gas | Electricity | Gas | Electricity |
| Time in Oven | 2 hr. 25 min. | 2 hr. 25 min. | 1 hr. 50 min. | 1 hr. 35 min. |
| Temperature of Oven | 370°-390° | 370°-390° | 370°-390° | 370°-390° |
| Wt. of meat and pan | 4834 gm. | 4530 gm. | 2568 gm. | 2781 gm. |
| Wt. of pan only | 498 gm. | 488 gm. | 475 gm. | 488 gm. |
| Net Wt. of Meat | 4336 gm. | 4042 gm. | 2083 gm. | 2280 gm. |
| Wt. of Meat and Pan after roasting | 4250 gm. | 3792 gm. | 2174 gm. | 2242 gm. |
| Net Loss in Wt. | 484 gm. | 738 gm. | 394 gm. | 539 gm. |
| % Shrinkage | 13.5% | 18.2% | 18.9% | 23.6% |

## Results Announced in 1933 Ice Cube Contest

*(Continued from Page 11)*

Refrigeration Committee for last year and the current year. John W. West, Jr., secretary of the Commercial Section, did efficient work as secretary of the Refrigeration Committee during the campaign period. For Electrolux Refrigerator Sales, Inc., H. A. Boyle was directly in charge of the contest activity.

Outstanding success of this first contest has encouraged the 1934 Refrigeration Committee to repeat the "ice cube" competition, this time as a spring sales activity. April, May and June are being dedicated to another drive on gas refrigeration; numerous prizes will be available, and a powerful direct-mail campaign will supplement the sales work.

*How the Winners Did It*

Winning of both first and second prizes in the "ice cube" sales drive by two offices of the Municipal Gas Co. reflects considerable credit upon John L. White, new business manager, as well as upon local managers Henry Duke and E. L. Buelow of the winning offices. Municipal Gas Co. is a unit of the Lone Star Gas System, serving several score smaller communities in Texas and Oklahoma.

Asked to comment upon the sales methods which brought success to his Ennis and Hillsboro offices, Mr. White ascribed the results to effective cooperative salesmanship.

"Teamwork was the keystone of success," said Mr. White. "Salesmen, meter readers, service men, cashiers and all other employees cooperating and working enthusiastically with the sales department and respective managers were responsible for the success attained. While many sales were closed by individuals themselves, the groups functioned as teams—office and outside employees originating and building prospective sales by telephone and personal contact and the managers following up and closing. If a cashier or meter man secured a good prospect but could not complete the sale for any reason, the name was turned over to the manager who immediately followed up. Prospects were also transferred from one employee to another when situations warranted. All were imbued with the spirit of cooperation, entirely forgetting individualism.

"Managers personally demonstrated on the sales floors by appointments in the evenings for prospects who could not get away from their duties during regular business hours.

Payne

ANNOUNCES

THE NEW Control-O-Gas
AUTOMATIC PILOT

WRITE FOR INFORMATION AND PRICES

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BEVERLY HILLS, CALIFORNIA

GENERAL CERAMICS COMPANY
REFRACTORIES

Refractories for Conversion Burners, Space Heaters, and Circulating Heaters. Quality maintained by modern production methods, careful workmanship, and accurately controlled burning. Our engineers will gladly cooperate on new designs alterations, production economies, etc.

General Ceramics Company, 71 West 35th Street, New York

This plan proved valuable in closing the sales started by other members of the local staffs.

"A novel feature of the campaign was the use of an Electrolux mounted on specially built auto trailer and operated with two 10-pound drums of Stargas. This mobile display toured the towns where the contest was in progress, and managers drove it to the front doors of prospects for demonstration. The refrigerator was equipped with glass front to show tiny gas flame in the process of making ice silently and economically. Prospects were also secured by pulling the trailer through the streets and parking at points where pedestrian traffic was heavy.

"In most instances sales were made by contacting both husband and wife in their home by appointment, followed by a sales floor demonstration. Sales were 'solid', being made largely to responsible and leading residents, business men, bankers, doctors, lawyers, and consumers of this type. Approximately 50 per cent of the sales were on the deferred payment basis, the remainder for cash."

The chairman of the A. G. A. refrigeration committee, in his letter of notification of the two Municipal winners, said in part:

"Your committee has been more than gratified at the splendid way the gas companies of the country responded to this contest, and we congratulate you and your organization on the effort which enabled you to win out among so many earnest competitors for the prize money.

"The achievement of your company, you must realize, is far greater than the winning of the prize money alone. For a more lasting and even a more important reward is the valuable work which the gas refrigerators sold will do—in publicizing gas as the modern fuel, in increasing your load, and in protecting the investment which every customer represents of your company.

"We are proud of your record as a concrete example of what consistent and planned effort *can* do in selling gas refrigeration. We hope it will be followed by every gas company in the country. Then, we will be well on the road to realizing the prophecy that a tiny gas flame will operate the refrigerators of America."

Cordially yours,
R. A. MALONY,
Chairman, Refrigeration Committee.

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### Clare N. Stannard Dies

As this month's issue goes to press word reaches *Western Gas* of the death of Clare N. Stannard, vice-president and general manager of the Public Service Co. of Colorado, Denver. Mr. Stannard passed away the morning of January 3.

### Red Devil Burner Bulletin

The Boiler Specialty Co., Houston, Texas, has published a new catalog, Bulletin 1-AB, covering Red Devil gas burners and related combustion apparatus manufactured and distributed by the company.

### International Petroleum Exposition

Dates for the International Petroleum Exposition at Tulsa, Okla., have been set for May 12-19, inclusive. W. B. Way is general manager of the exposition.


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**Two thousand pounds pressure to the square inch can be controlled, and gas can be passed on to the main or the distributing line at reduced pressure to suit requirements, by the use of the proper C-F Regulator. Standard Regulators are designed for pressures up to 600 pounds. For higher pressures, designs are adapted according to specifications.**

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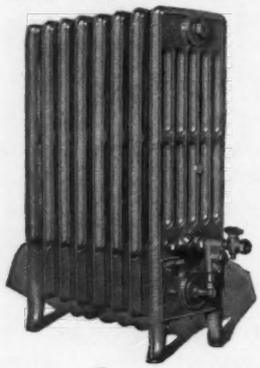

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# Line From Hebron Field Supplements Syracuse Supply

THE New York State Natural Gas Corp. recently completed construction of a 39-mile, 10-inch pipe line extending from the Hebron natural gas field eastward to the Tioga gas field where it connects into the 100-mile, 20-inch Syracuse line which supplies gas to the city of Syracuse. This new line is the third outlet from the Hebron field, which was discovered in November of 1931.

The Hebron field is located in the north central part of Potter County, Pa., about 5 miles from Coudersport, Pa. The first well was drilled in December, 1931, and had an initial open flow of 9,000,000 cubic feet with an initial rock pressure of 2200 pounds. At the present time, there are 12 producing wells in the field with a total open flow of approximately 210,000,000 cubic feet. The gas comes from what is known as the Oriskany Sand, found at a depth of from 5,000 to 5300 feet.

The same type of construction was used on the new 10-inch line as was used on the 100-mile Syracuse line which it serves, viz., plain-end steel pipe joined in the field with Dresser couplings. The 10¾-inch OD steel pipe was supplied in 40-foot lengths, each length consisting of two 20-foot sections welded together at the pipe mills The field construction work was done by Mitchell & Stewart, of Dallas, Texas.

Much of the right-of-way lay through thickly wooded mountainous country. The narrow trench, 16 inches wide by 42 inches deep, was dug for the most part by machine. Where the going was extremely rough, hand digging was resorted to.

The pipe-laying construction crew consisted of 24 men, 12 of whom assembled from 75 to 132 Dresser joints per 8-hour day, depending upon right-of-way conditions; through good country the crew laid a mile of line per day.

*View of Dresser-coupled line of New York State Natural Gas Corp., taken near Ulysses in Potter County, Pa.*

All the necessary pipe bends were made cold in the field with the aid of two tractors. The pipe was laid by coupling a number of lengths above the ditch on skids and lowering the assembled line in sections, always keeping the end of the completed line above the ditch. The back-filling was done by tractors as the construction progressed.

The line was tested at 600 pounds pressure and will operate under a working pressure of 300 to 350 pounds per square inch.

# Joint Meetings at Memphis Dated for March 21-23

MARCH 21-23 have been selected as definite dates for the joint meeting of the Southern Gas Association, Southern Regional Sales Conference, and Southwestern Regional Sales Conference. This combines for the first time the attractions of the Southern Gas Association's annual convention with the regional conference sales programs which have been an important feature of the A.G.A. Commercial Section activity for several years.

Memphis, Tenn. will be host to the meetings, and J. J. Brennan, commercial manager of the Memphis Power & Light Co. is chairman of the committee on arrangements.

Among the subjects to be discussed on the sales conference program are the following:

Sales Planning for Better Times—By Small Companies, By Large Companies.

Promoting Gas Refrigeration through Utilities and Dealers.

Today's Industrial Gas Development.

Operating Sales Departments on a Load-Building Basis Rather than on an Appliance Merchandising Basis.

Developing Appreciation and Sale of Automatic Hot water Service.

Merchandising Our Serivce to Commercial Customers.

Promoting Kitchen Planning Service (A Playlet on Kitchen Modernization Will Also Be Given).

Space Heating Possibilities.

Featured in general sessions will be these subjects: Departmental Co-ordination for Greater Gas Sales Development (Employee Training for Sales Aid; Employee Training for Efficient Installation and Servicing Practice); Rates; Advertising.

Among those invited to appear on the Sales Conference programs are J. F. Orr, United Gas Public Service Co., Houston, Texas; E. C. Whitcomb, Lone Star Gas Co., Fort Worth, Texas; H. E. Randall, United Gas Public Service Co., Houston; D. H. Levan, Jacksonville Gas Co., Jacksonville, Fla.; L. L. Baxter, Arkansas Western Gas Co., Fayetteville, Ark.; H. E. Dexter, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.; Wm. F. Eve, Jr., Atlanta Gas Light Co., Atlanta, Ga.; C. B. Wilson, Little Rock Gas & Fuel Co., Little Rock, Ark.

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For further information, write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Bldg., Chicago, Ill.

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## George S. Campbell Completes Three Decades With L. A. G. & E. Corp.

*George S. Campbell*

George S. Campbell, manager of the Los Angeles Gas & Electric Corp.'s Pasadena district rounded out 30 years of service in December with the L.A.G.&E. Several hundred gas company employees and executives, city officials and civic leaders, gathered at the Masonic Temple in Pasadena on December 2 to celebrate the anniversary.

Addison B. Day, president and general manager of the corporation, presented Mr. Campbell with a picture and scroll on which was engraved a tribute from gas company executives who had worked with him during his three decades with the organization.

## Electrolux Laboratories and Research Coordinated at Evansville, Ind.

Removal of the Electrolux refrigerator laboratories and research activity from 408 East 111 St., New York City to the Evansville, Ind. manufacturing plant has been announced by F. E. Sellman, vice-president of Electrolux Refrigerator Sales, Inc. Under the new plan research and testing work will be coordinated at Evansville.

The laboratories are staffed by 30 research engineers and technical experts under the direction of Dr. William R. Hainsworth. Dr. Hainsworth received the 1933 Charles A. Munroe Award granted annually by the American Gas Association for outstanding achievement in the gas industry. The award was given to Dr. Hainsworth for his perfection of the air-cooling principle embodied in Electrolux models.

## Oklahoma Ruling Affecting Property Acquired by Condemnation

The Supreme Court of Oklahoma on December 12 in a five to four decision ruled that public utilities acquiring real property by condemnation, own in fee any part of such property which is not necessary to the purpose for which the property is acquired. This decision was rendered in the case of W. R. Ramsey vs. William J. Leeper, and reversed the decision of the District Court of Canadian County. A dissenting opinion signed by four justices held that property acquired by condemnation should revert when and if not used for the purpose for which it was required.

## Lone Star Talking Film Features Kitchen Improvement

A short talking film depicting a "40-Year Cycle of Texas Kitchens" is being shown in communities along the Lone Star System. The film was directed by C. I. Langdon and Margaret Marable of the Lone Star organization and contrasts equipment used in kitchens of 1893, 1913 and 1933.

# Classified Advertising

**Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $6.00 monthly on 12-time contract.**

### Situations Wanted

Situation wanted by gas engineer, technical graduate; 34 years old; 10 years with affiliated holding and operating companies. Experience covers high and low pressure distribution and transmission, coal and water gas manufacture, natural and refinery gas distribution; particularly experienced on unaccounted-for gas problems. References. Address Box 241, *Western Gas,* 810 South Spring St., Los Angeles, Calif.

Accountant — Bookkeeper. Over twenty years practical experience. Can take complete charge. Furnish financial and co-related statements. Also Federal Taxes. Any location. Very moderate salary. Address Box E-237, *Western Gas,* 810 South Spring St., Los Angeles, Calif.

Situation wanted by young man skilled in business management, accounting and auditing. Highest references can be furnished as to character, integrity and ability. Address Box 243, *Western Gas,* 810 South Spring St., Los Angeles, Calif.

Situation wanted by gas manager and engineer; university graduate; 22 years in all branches, water gas, coal gas, oven gas, natural gas, high and low pressure distribution. Address Box 239, *Western Gas,* 810 South Spring St., Los Angeles, Calif.

## People's Natural Gas Co. Transfers Auburn, Forest City Managers

W. H. Rose has been transferred from the Forest City, Iowa, office of the People's Natural Gas Co. to become manager of the company's office in Auburn, Neb. Thomas Rice who has taken over Mr. Rose's managerial duties in Forest City comes from the Auburn office where he was manager.

## Receiver Named for Pub. Serv. Corp. of Mississippi

Allen Bridgeforth has been named receiver for the Public Service Corp. of Mississippi, Hattiesburg, Miss. The company was incorporated in 1931 and supplies Hattiesburg, Coolins, Mt. Olive and Magee, Miss.

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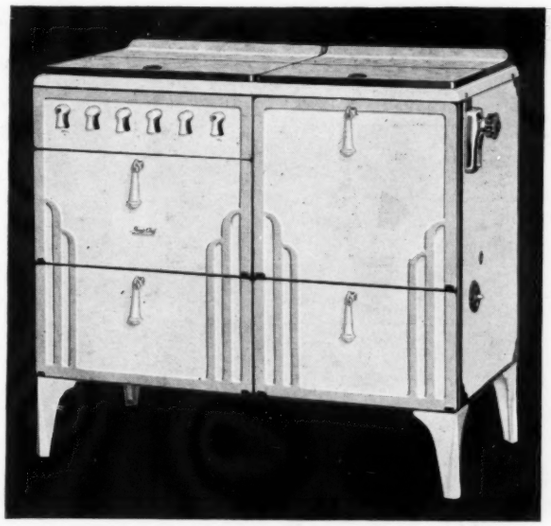

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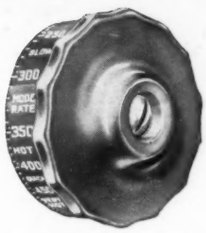

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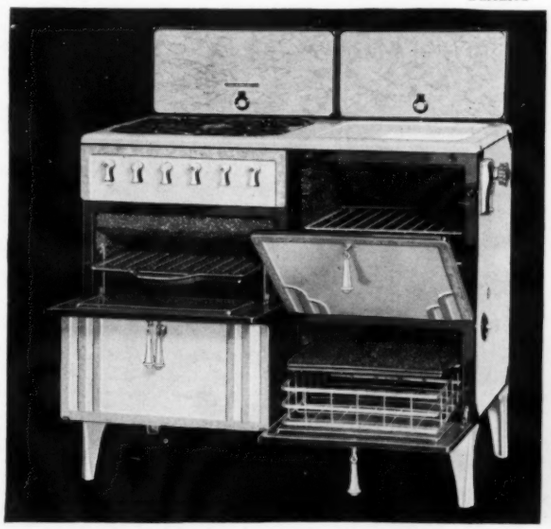

# MAGIC CHEF
## GAS RANGE
# SERIES 1900
## *with*
## ELEVATED BROILER

HERE'S a new Magic Chef series that will make an instant appeal to the modern housewife. In addition to all other advanced Magic Chef features, Series 1900 has an *Elevated Broiler* of the handy drawer type, located just under the manifold.

The broiler is entirely separated from the oven and has its own burner specially drilled to give a direct, even flame. Thus broiling can be done without interfering in any way with the operation of the oven.

The elevated position of the broiler does away with awkward stooping, making broiling decidedly more comfortable and convenient.

The space beneath the oven, fitted with a special baffle to shut off excessive heat from oven burner and a spot welded plate basket, can be used either as a warming compartment or for utensil storage.

Series 1900 comes in four finishes—white with black trim, ivory with black trim, ivory with tan trim, ivory with green trim . . . Write for color illustrations and full description.

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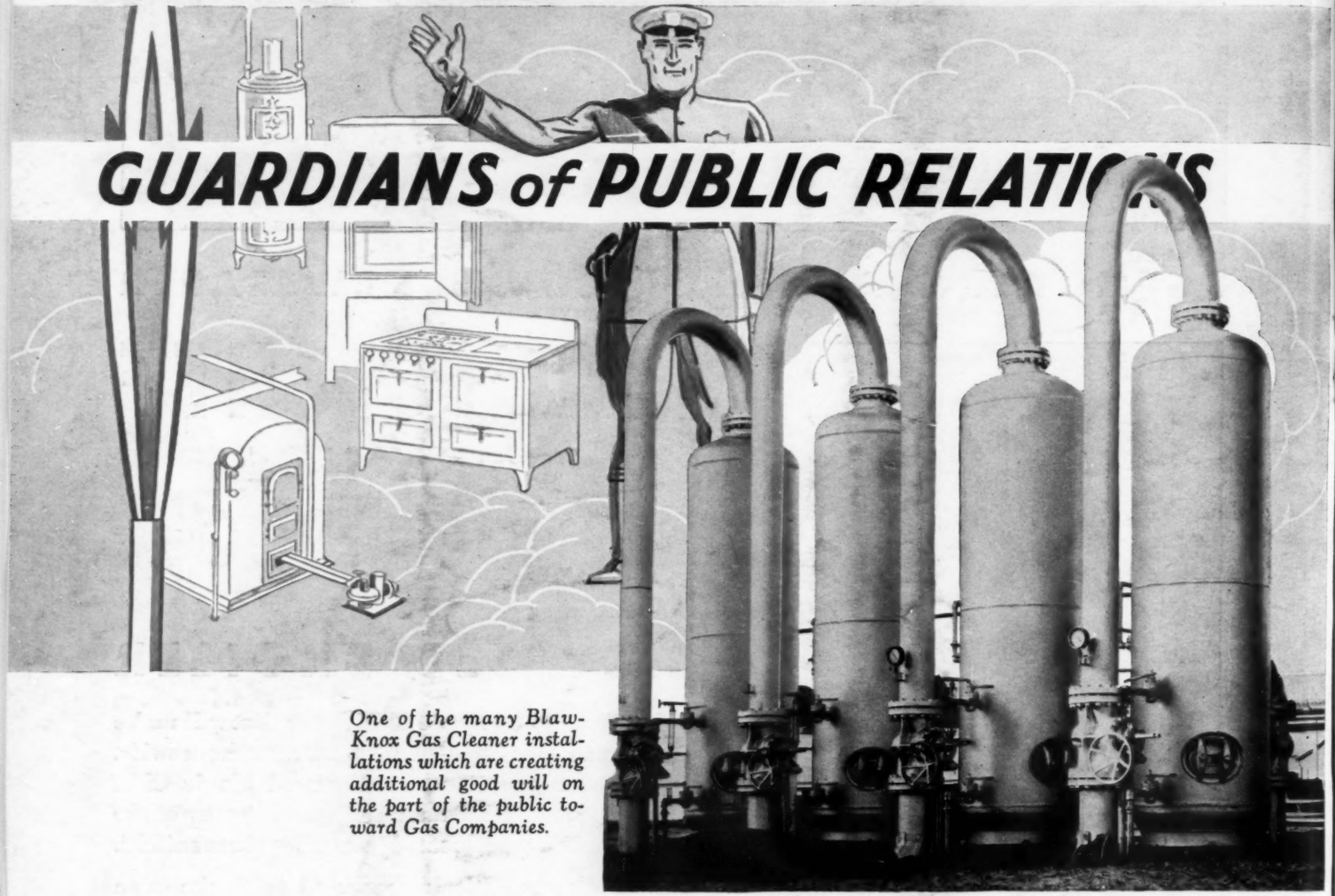

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